WIRELESS SYSTEMS MANAGER

SENNHEISER WSM

Instruction manual

SENNHEISER

Contents

Important information regarding this instruction manual

Additional information on the "Wireless Systems Manager" software can be found at http://en-de.sennheiser.com/service-support/wsm.

Additional information on the transmitters and receivers can be found in the individual instruction manuals on the product pages at www.sennheiser.com.

For your safety

Individuals who are not trained in the operation of computers can unintentionally alter computer files, corrupt or erase them. Ensure that only competent individuals operate the computer on which the WSM software is installed.

Always make backups when you create or edit configurations and store the backups in a safe location.

When you are using a firewall, please provide access via the corresponding ports for the WSM.

Capabilities of the WSM

The "Wireless Systems Manager" (WSM) is the professional software for remote monitoring and controlling Sennheiser wireless microphone and monitoring systems. Due to its intelligent features, the WSM software is the ideal solution for use in TV studios and shows, live performances and musical productions.

Using the WSM software, you can:

- display and monitor the connected devices,
- configure the connected devices,
- perform a frequency preset scan (see "Frequency management" on page 33),
- control 2000/3000/5000/6000/9000 systems and ew G3 systems, combined systems and multi-channel systems,
- update the firmware of the receivers and the transmitters,
- listen to live streams over RTP/RTSP or using Dante (only supported by EM 9046 receivers, see "Configuring streaming" on page 84).

The following Sennheiser systems can be configured using the WSM:

Only transmitters and receivers that are equipped with the same compander system can be combined with each other.

System		Compander system	Receivers	Receivers	Charger
Wireless monitoring system	2000 series	HDX	portable: EK 2000 IEM	stationary: SR 2000 IEM SR 2050 IEM	–
	ew G3	HDX	portable: EK 300 IEM	stationary: SR 300 IEM	–
	ew G4	HDX	portable: EK IEM G4	stationary: SR IEM G4	–
Wireless microphone system	ew G3	HDX	stationary: EM 500 G3 EM 300 G3	portable: SK ew G3 SKM ew G3	–
	ew G4	HDX	stationary: EM 300 - 500 G4	portable: SK ew G4 SKM ew G4	–
	2000 series	HDX	stationary (2000 series receivers): EM 2000 EM 2050	portable: SK 2000 SKM 2000 SKP 2000	–
	3000 series/ 5000 series	HiDyn *plus*™	stationary (3000 series receivers): EM 3732 Command EM 3732 | EM 3731	portable: SK 5212 SKM 5200 SKP 3000	–
	Digital 6000	–	EM 6000	SK 6000 SKM 6000	L 6000
	Digital 9000	–	EM 9046	SK 9000 SKM 9000	–

System requirements

Required hardware

Processor:	Core i-series processor, 2.4 GHz or similar
Memory (RAM):	Windows: min 4 GB / Mac: min 8 GB
Hard drive:	min. 500 MB available
Ports:	Ethernet port (min. 100 MBit/sec)
Screen resolution:	min. 1280 x 1024 pixels

If your hardware complies with these requirements, you can operate the WSM with approx. 32 channels.

Required operating system

The WSM software runs on the following operating systems:

- Microsoft® Windows® 7 (32 and 64 Bit)
- Microsoft® Windows® 10 (32 and 64 Bit)
- Apple Mac™ OS X Sierra (10.12)
- Apple Mac™ OS X High Sierra (10.13)

Putting the system into operation

Installing the WSM software

To install the WSM software on your computer:

- Download the current version of the WSM software from the product page at www.sennheiser.com.
- Close all currently running programs, including those running in the background (e.g. anti-virus programs).
- Start the installation by double-clicking on ''setup.exe'' (Windows) or ''Sennheiser_WSM_Setup_MAC.dmg''(Mac).
- Follow the wizard's instructions.
  The installation wizard suggests installation on the program folder on the ''C:\'' drive as the subfolder ''...\Sennheiser\Wireless Systems Manager'' (Windows) or Macintosh HD\Programs (Mac).
  You can change the install path by clicking on ''Change directory''.

. You can install the WSM software on several computers in a network (see ''Using several WSM softwares in a network – multi access function'' on page 7).

Configuring the network

All devices are factory preset to automatic IP address assignment.

To enable communication between the WSM software and the connected devices, configure the network (LAN connections) as follows:

Automatically obtaining an IP address

- Go to the Network Settings in your operating system.
- In the Internet Protocol (TCP/IP) Properties window select the ''Obtain an IP address automatically'' option button for PCs or the ''Configuration DHCP'' option button for Macs.
  The assignment of an IP address may take some minutes. With this, the configuration of the network is terminated.

- Only launch the WSM software after having configured the network. For information on how to connect the transmitters and receivers to the computer, please refer to the individual instruction manuals.
- If you want to use several WSMs in a network, please follow the instructions in chapter ''Using several WSM softwares in a network – multi access function'' on page 7.

Launching the WSM software

When you have connected the devices:

▶ Switch on all connected devices.

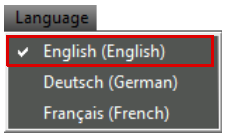
To launch the WSM software:

▶ Double-click on the program icon on the desktop.

Or:

▶ Click on "Start" > "Programs" > "Wireless Systems Manager".
This launches the WSM software and the main window appears.

Setting the language

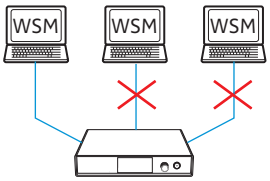


▶ Click on "Language" and select the desired language.
A tick appears in front of the selected language. The language of the software interface is changed.

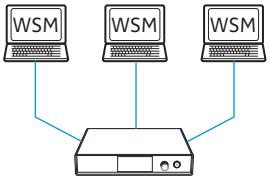
Using several WSM softwares in a network – multi access function

The multi access function allows you to simultaneously network up to 6 computers with the Sennheiser devices. Configurable access rights establish clear procedures and hierarchies for your production.

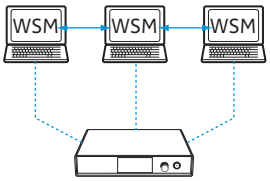
You can install the WSM software on several computers in a network. For the individual application scenarios you can assign different rights for accessing the devices in the network (e.g. for the parameters):



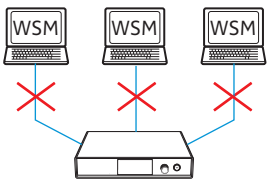
- "Exclusive":
  - All access rights are assigned to only one WSM (see page 9).
  - The access rights cannot be shared with other WSMs.



- "Shared":
  - All WSMs have the same access rights (see page 9).
  - While one WSM is accessing a device (remotely), this device is locked for all other WSMs until this action is terminated.



- "Hands Over":
  - All access rights are assigned to only one WSM (see page 9).
  - However, the access rights can be shared with other WSMs.



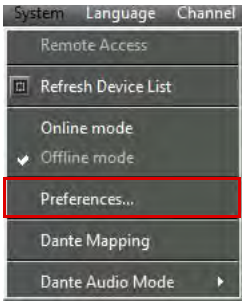
- "Remote Disable" (no access rights):
  - The WSM has no access rights.
  - The WSM is solely used for monitoring.

Proceed as follows:

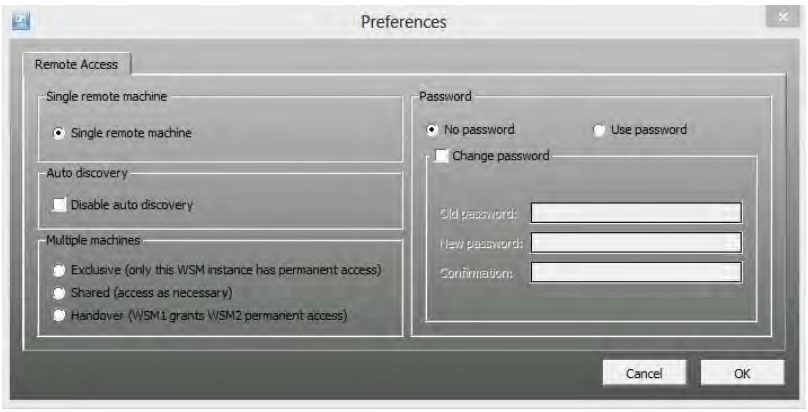
1. First define the access rights for only one WSM software (see the following chapter for details).

2. Adapt the access rights of all other WSMs to the settings of the first one (see "Assigning access rights to additional WSMs" on page 9).
   Or:
   Deny access for all other WSMs (see "Withdrawing access rights from a WSM" on page 10).

Assigning access rights to a WSM



▶ Click on "System" > "Preferences".
The "Preferences" window opens.

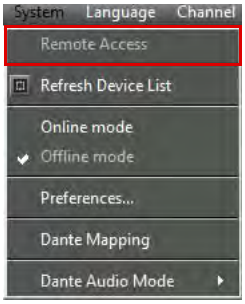


If the "Disable auto discovery" check box is activated, the WSM is prevented from causing unwanted network traffic. In this case, however, new devices in the network cannot be detected.

▶ Under "Multiple machines" select one of the options "Exclusive", "Shared" or "Hands Over".

▶ Click on "OK".
The WSM software obtains the selected access rights.

To be able to access the devices:



▶ Click on "System" and check if the "Remote Access" command is ticked.

If "Remote Access" is not ticked:

▶ Click on "Remote Access".
You may be requested to enter a password (see page 10). Enter the password if available or contact your system administrator.
A tick appears to the left of the item and a red dot appears in the panels.
You have access to the devices.

- If you have selected "Exclusive" or "Hands Over", red dots appear in the panels. These dots indicate that you have access to these devices.

- To protect the WSM software with a password, proceed as described in chapter "Protecting the WSM with a password" on page 10.

Assigning access rights to additional WSMs

When using additional WSMs in a network, adapt their settings according to the previously selected access rights. If you do not want to assign any access right to a WSM software, just deactivate it (see "Withdrawing access rights from a WSM" on page 10).

Have you selected "Exclusive" for the first WSM?

In this case, the first WSM being registered in the network owns all access rights. In order to avoid any collisions, you should deactivate access to the devices for all other WSMs (see "Withdrawing access rights from a WSM" on page 10).

If you should assign "Exclusive" access right to several WSMs, then access is random. The WSM which registers quicker with the device owns all access rights. This can, under certain circumstances, lead to confusion during operation.

Have you selected "Shared" for the first WSM?

All WSMs with this access right are equal. While one WSM is accessing a device (remotely), this device is locked for all other WSMs until this action is terminated.

- Select "Shared" for all other WSMs in the network that shall obtain access rights. Proceed as described in chapter "Assigning access rights to a WSM" on page 8.

Have you selected "Hands Over" for the first WSM?

First one WSM owns all access rights. However, the access rights can be requested by another WSM with "Hands Over" right. The WSM that owns the access rights receives a message and can then share the access rights with the other WSM.

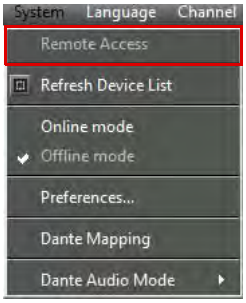
- Select "Hands Over" for all other WSMs in the network that are authorized to request access rights if required. Proceed as described in chapter "Assigning access rights to a WSM" on page 8.

To request the access rights:

- Make the desired settings (e.g. parameters).
  WSM transmits a message to the user of the WSM with the access rights. The user confirms the assignment of access rights. The parameter is transferred to the device.

Withdrawing access rights from a WSM

If you want to use a WSM exclusively for monitoring the system, you can withdraw the right to access the devices as follows:



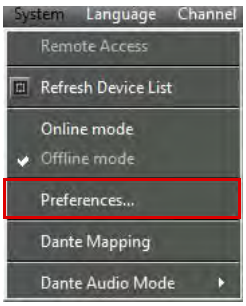
▶ Click on ''System'' and check if the ''Remote Access'' command is ticked.

If ''Remote Access'' is ticked:

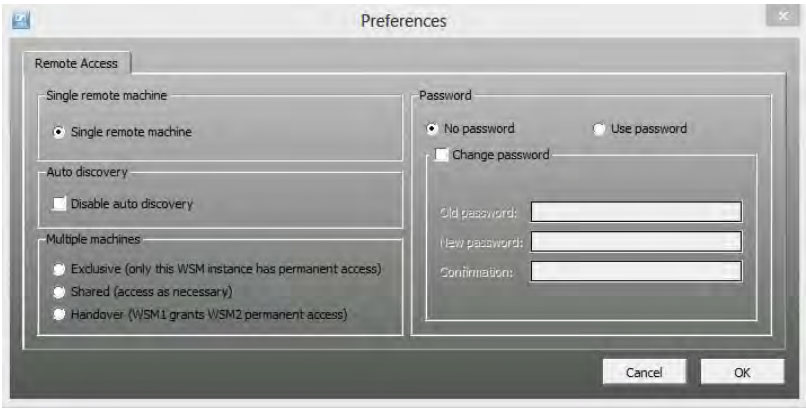
▶ Click on ''Remote Access''.
The tick disappears. The rights to access the devices are, thus, withdrawn.

Protecting the WSM with a password

To protect this WSM and its devices against manipulation, you can enter a password; proceed as follows:



▶ Click on ''System'' > ''Preferences''.
The ''Preferences'' window opens.



▶ Select the ''Use Password'' radio button.

To set up a password:

▶ Enter your password in the ''New Password'' and ''Confirmation'' fields.
The ''Old Password'' field remains empty.

▶ Click on ''OK''.
After this, the access rights can be modified only by users who know this password.

To change your password:

▶ Enter your old password in the ''Old Password'' field.

▶ Enter your new password in the ''New Password'' and ''Confirmation'' fields.

▶ Click on ''OK''.
After this, the access rights can be modified only by users who know this password.

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- If you want to disable the password protection, click on the ''No Password'' radio button.
- If you should have forgotten your password, please contact your local Sennheiser partner.

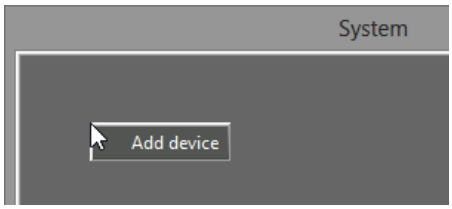
Registering a device with a static IP address

If you have assigned a device a static IP address, this device is not automatically detected by the WSM. You must manually register these devices with each WSM.

- In the system window, click on the "Devices" tab.
  If the system window is not shown, click on "View" > "System window".

To register the device with a WSM:

- Right-click a free area in the system window.
  A shortcut menu appears.



- Click on "Add device".
  The "Add device" window opens.

- Click on the desired device.
- In the "IP Address:" field, enter the static IP address.
- Click on "OK".
  Registration of the device is now complete. The device is marked by a red cross in the system window. The device list is updated after a short time. A green tick appears in front of all detected devices.

. If the WSM cannot detect the device with the static IP address, check the settings of the device and of your network.

- To register additional devices, repeat the above steps.

Saving the configuration

To save the registered device with the static IP address:

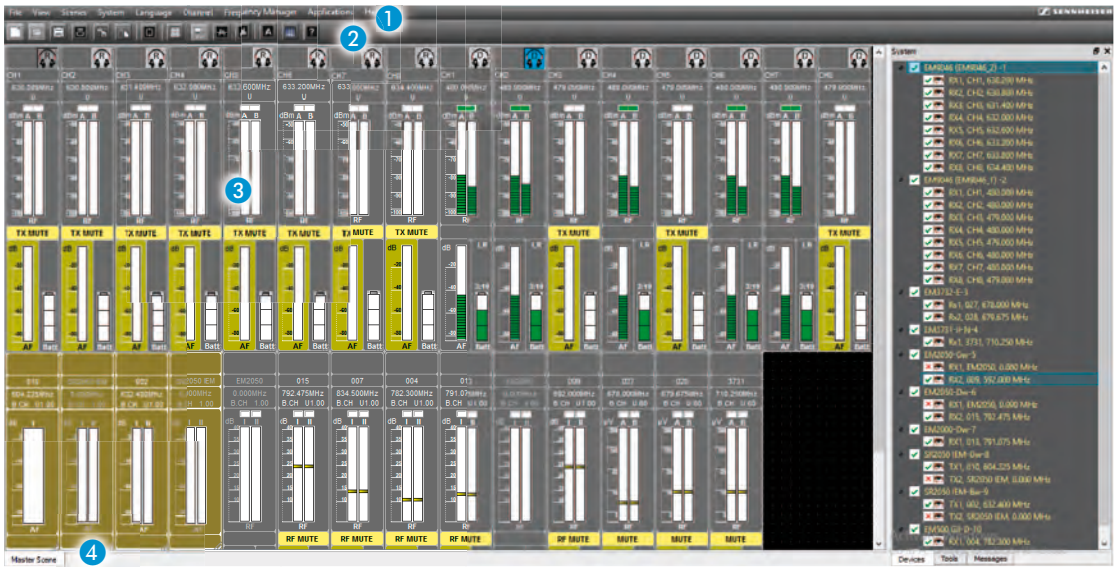
- Click on "File" > "Save Configuration" or "File" > "Save Configuration As...".

If you close the WSM without saving the configuration, you must register the devices with a static IP address again. These devices are not detected automatically.

The operator interface of WSM

This chapter describes the operator interface of the WSM software. You will become acquainted with the system setup and the individual menus.

Main window



The main window contains the following regions:

1. Menu bar
2. Symbol bar (tool bar)
3. Display area
4. Status bar

Menu bar

The menu bar 1 is always visible.

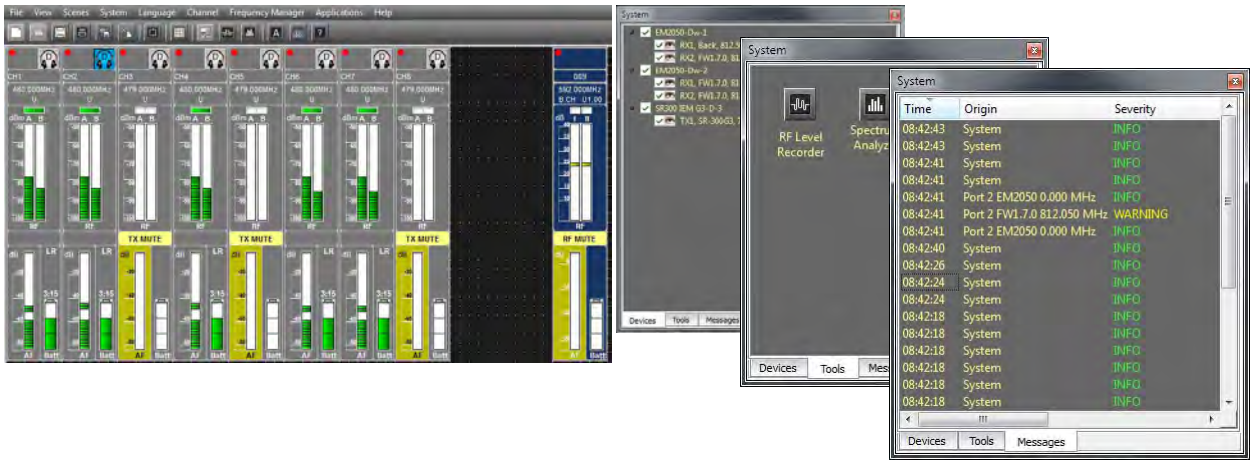
You can select from the following menus (see page 15 and the following): ''File'', ''View'', ''Scenes'', ''System'', ''Language'', ''Channel'', ''Frequency Manager'', ''Applications'', ''Help''

Symbol bar (tool bar)

You can operate the WSM via the menu bar 1 and via the buttons in the symbol bar 2. The symbol bar can be shown or hidden (''View Menu'' > ''Tool Bar'').

Display area

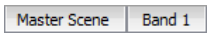
Scene Panels System window with tabs



With the standard settings, the display area ❸ is divided in two. The "panels" for the connected devices are displayed on the left; this region is designated as the scene.
The tabs of the system window are displayed on the right.

Scene

In a scene, you can set up and sort panels (see "Working with panels" on page 76). Each panel displays a channel or a connected device.



When you create a new configuration, there is first only the "Master Scene". For a better overview, you can set up additional scenes (see "Adding new scenes" on page 72). You can also copy panels, together with their panel settings, from one scene to another.

System window

The system window can be enlarged or reduced by dragging the border between the scene and the system window. By selecting the menu item "View" > "System Window", you can show or hide the system window.

You can toggle between the "Devices" (device list), "Tools" and "Messages" (message list) tabs.

"Devices" tab

The "Devices" tab displays a list of all connected devices.
If you click on the plus box "+" next to an entry, it will expand and display the channels of the device.

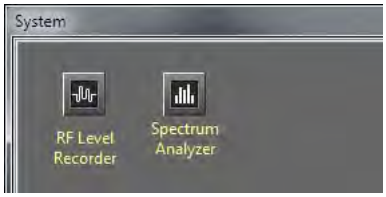
The devices connected to an EM 3732 or EM 3732 Command are displayed with the channel number (RX 1 / RX 2).

Display	Meaning
☑	Device is switched on.
☒	Device is switched on or WSM is in "Offline" mode (see page 23).
👁	Device is indicated as a panel in the currently selected scene.

You can select one or several devices, drag these, as panels, in the current scene and change the device settings (see ''Working with panels'' on page 76).

''Tools'' tab

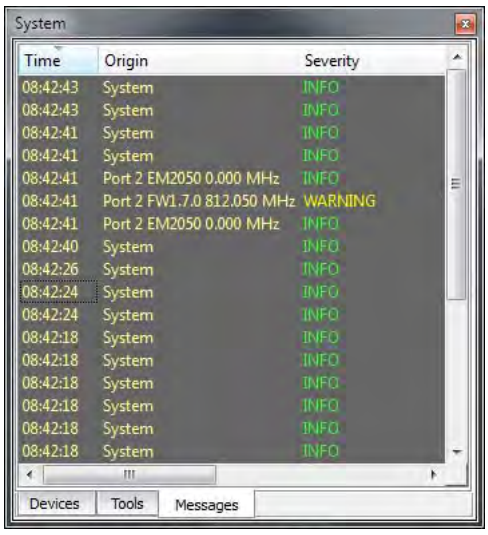
The ''Tool'' tab has two icons that you can drag in the scene. In each case, a new window appears in the scene (see ''Recording the field strength using the tools'' on page 92):



- ''Spectrum Analyzer''
  This tool and a stationary receiver allow you to check a defined frequency range for signals, to monitor these signals and to record the measured values.
- ''RF Level Recorder'':
  This tool allows you to record the field strength over a defined period of time.

''Messages'' tab

The ''Messages'' tab displays all messages of the devices. The messages appear in chronological order with their ''Origin'' and their ''Severity''.

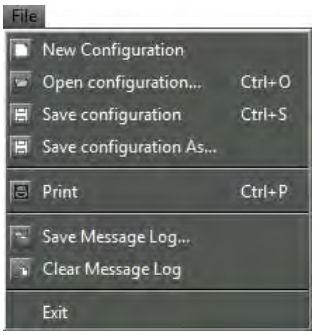


Status bar

The last message from the devices is displayed on the left in the status bar (4).
The current date and time are displayed on the right.

Overview of menus

The "File" menu

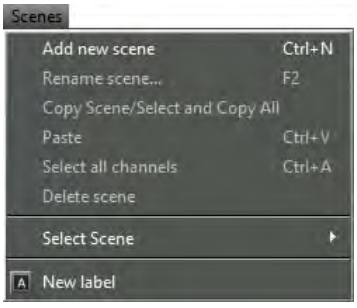


Menu item	Function of the menu item	Button
"New Configuration..."	Creates a new configuration.	
"Open Configuration..."	Opens a saved configuration.	
"Save Configuration"	Saves the current configuration under the same name.	
"Save Configuration As..."	Saves the current configuration under a new name.	
"Print"	Prints the current configuration as graphic or text.	
"Save Message Log..."	Saves the messages in the system window as a file ("Messages" tab).	
"Clear Message Log"	Deletes the messages from the system window ("Messages" tab).	
"Exit"	Terminates the "WSM".	

The "View" menu

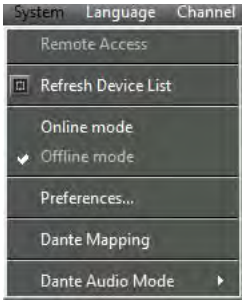
Menu item	Function of the menu item	Button
"System Window"	Shows or hides the system window.	
"Tool Bar"	Shows or hides the tool bar.	
"Show Grid"	Shows or hides the grid for aligning the panels.	
"Snap to grid"	Aligns the panels to the grid if you move the panels.	
"Auto Arrange"	Automatically arranges the panels side by side and one below the other, depending on the screen size.	

The "Scenes" menu



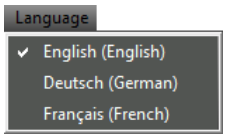
Menu item	Function of the menu item
"Add New Scene"	Creates a new scene.
"Rename Scene..."	Changes the name of the selected scene.
"Copy Scene"	Copies the current scene.
"Paste Scene"	Pastes the current scene.
"Delete Scene"	Deletes the selected scene from the display. The configuration of the devices is retained.
"Select Scene"	Changes to a different scene.
"New Label"	Creates a comment field in the selected scene.

The “System” menu



Menu item	Function of the menu item	Button
“Remote Access”	Activates or deactivates access to the parameter settings of the devices (see page 89).	
“Refresh Device List”	Updates (refreshes) the device list in the system window (“Devices” tab). New devices are displayed, previously moved or deleted panels are repositioned in the display area.	
“Online Mode”	Enables operation of the connected devices (live operation).	
“Offline Mode”	Must be activated for the pre-configuration (“Device Configuration”, see page 23). Device connections will be interrupted.	
“Preferences...”	For setting the access rights of different WSM in a network and for activating password protection (see page 23).	
“Dante Mapping”	For manual mapping of the EM9046 receivers to their corresponding Dante modules (see page 85).	
“Dante Audio Mode”	Selects “Stereo” or “Mono” mode for live stream listening. In stereo mode, you can listen to up to four channels using WDM, to up to 32 channels using ASIO on Windows and to up to 32 channels using a MAC. In “Mono” mode, the number of available channels is doubled (see page 88).	

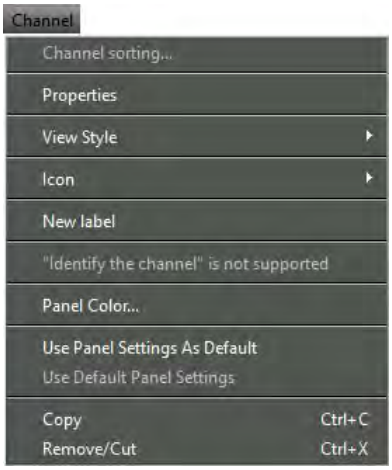
The “Language” menu



Menu item	Function of the menu item
“English”	Changes the language of the software interface.
“Deutsch”	
“Français”	

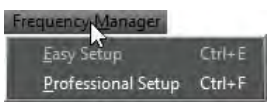
The "Channel" menu

The following menu items can vary and depend on whether you have selected one panel or several panels.



Menu item	Function of the menu item
"Channel Sorting..."	Sorts the sequence of panels in a scene according to user default (for EM 3732-II and stationary devices of the ew G3 and 2000 series; see page 80).
"Properties" / "Common Properties"	Displays the parameters of the selected device or the common properties of the selected devices.
Icon"	Displays a submenu with a selection list of different icons and numbers (see page 79). Pictures can also be used.
"New Label"	Creates a label for comments on the selected panel (see page 82).
"Identify Channel"	Displays the device belonging to the panel (for EM 3732-II and stationary devices of the ew G3 and 2000 series; see page 81).
"View Style"	Displays a submenu with a selection list of three different graphical representations for the "receiver" panels (see page 77).
"Panel Color..."	Assigns a color to the border of the panel (see page 79).
"Use Panel Settings As Default"	Saves settings such as panel style, size, icon or number and color of the selected panel. These standard panel settings can be applied to other panels (see page 79).
"Use Default Panel Settings"	Applies the last saved standard panel settings to the selected panel (see page 79).
"Copy"	Copies the selected panel to the clipboard (see page 80).
"Remove/Cut"	Deletes the selected panel from the display area. The panel can be pasted to another scene. The settings of the panel and the device settings are retained (see page 80).
"Paste"	Copies the panel from the clipboard to the selected scene (see page 80).

The "Frequency Manager" menu



Display	Function of the menu item
"Easy Setup"	Detects and allocates unused frequencies to the system (see page 33).
"Professional Setup"	Detects and allocates unused frequencies to the system (see page 41).

The “Applications” menu

Menu item	Function of the menu item	Button
“Device configuration”	Device pre-configuration in offline mode (see page 23).	
“Stationary Devices”	Allows to define, add and export new frequency ranges for existing stationary devices (see page 38).	
“Firmware Update”	Starts the firmware update (see page 29).	
“Dante Firmware Update”	Starts the firmware update for Dante modules (see page 32).	
“RF Level Recorder”	Monitors the field strength of a receiver’s diversity channels over a defined period of time and records the measured values (see page 94).	
“Spectrum Analyzer”	Checks a defined frequency range for signals; monitors these signals and records the measured values using a stationary receiver (see page 92).	

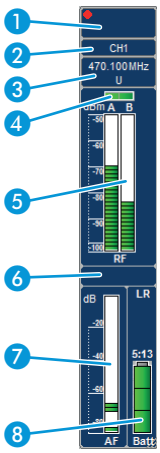
The “Help” menu

Menu item	Function of the menu item	Button
“Help...”	Opens a window in which the online help is displayed.	
“About...”	Opens a window in which the version number is displayed.	

Layout of the panel

Every panel displays a stationary device. The graphical representation of the panel depends on the device type and the settings made under "View Style" in the "Channel" menu. For details on the possible settings, see "Working with panels" on page 76.

The following screenshot shows an example panel:



1. Icon / number / picture
2. Name of the device
3. Frequency and channel display
4. Diversity display
5. Field strength display
6. Status field / Display of the audio outputs AF and COM
7. Modulation display
8. Battery status

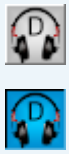
A red dot in the panel indicates that you have access rights for these devices (see "Using several WSM softwares in a network – multi access function" on page 7).

1 Icon

The top left corner of the panel can be provided with an icon, a number or a picture (see "Selecting an icon for a panel" on page 78).

Depending on the connected device, one of the following icons appears:

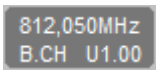
Icon	Peculiarity	Meaning
 lights up	EM 373X receivers only	An external word clock generator is connected and switched on.
 flashes		The receiver is not synchronized with the word clock generator (see instruction manual of the device).
		The receiver is working with the internal word clock generator.
	ew G3 series	No display appears.

Icon	Peculiarity	Meaning
	EM 9046 receivers only	Streaming is not enabled (for information on how to enable streaming, see page 84).
		Streaming is enabled but no stream is played. The letter R indicates that RTP/RTSP streaming is used. RTP/RTSP streaming is active and streams can be listened to.
		Dante streaming is enabled but no stream is played. Dante streaming is enabled and streams can be listened to.

❷ Name of the device

The name set on the device is displayed. The name can be changed in the "Properties" window (see page 89).

❸ Frequency and channel display



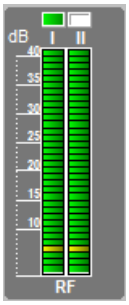
The frequency of the device appears below its name. The channel is displayed below the frequency (see ""Easy Setup" frequency management" on page 33 and "Working with panels" on page 76).

❹ Diversity display

The active antenna is displayed in green.
The labeling of the diversity sections depends on the device type:

- 3000 series receivers: "A" and "B"
- ew G3 and 2000 series receivers: "I" and "II"

❺ Field strength display (RF)

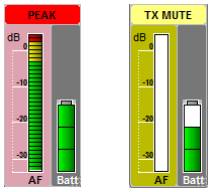


The bar graphs indicate the current field strength. The horizontal yellow line indicates the set squelch threshold (see "Working with panels" on page 76).

If the field strength is below the squelch threshold, the bar appears in red and the audio output is muted.

❻ Status field / Display of the audio outputs AF and COM

If a threshold value on the device is exceeded or undershot, a message appears in the status field.



The messages are highlighted in different colors. The part of the panel to which the message refers is also highlighted.

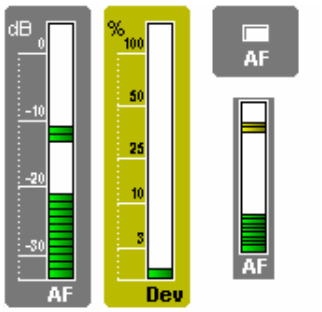
Display	Color	Meaning of the message
MUTE	yellow	The device is muted.
PEAK	red	The device is overmodulated.
LOW BATT	red	The device's battery is almost flat.
LOW RF	red	The squelch threshold is almost reached.

The message also appears in the system window (''Messages'' tab) and in the status bar.

With the EM 3732 Command twin receiver, the status field appears in alternation with the current status of the audio and command outputs (see EM 373X instruction manual):

Display	Audio output...	is...
AF COM	AF out	switched on
	Command	switched on
AF COM	AF out	switched off
	Command	switched on
AF COM	AF out	switched on
	Command	switched off
AF COM	AF out	switched off
	Command	switched off

7 Modulation display (Deviation/AF)



Level indicator for the audio level at the transmitter.

The threshold values are displayed in color in the modulation display. A yellow section in the bar graph indicates that the transmitter is fully modulated. An additional red section indicates overmodulation. If this occurs, reduce the modulation level on the transmitter.

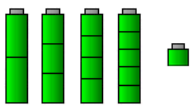
The modulation displays depend on the device type:

- 3000 series receivers: ''Dev''
- ew G3 and 2000 series receivers and stationary transmitters: ''AF''

With these receivers, the modulation can be shown in different views (see ''Changing the graphical representation of panels'' on page 77):

- ''Variant'' 1 and 3: The modulation is shown as a bar graph.
- ''Variant'' 2: The modulation is shown as a colored box. The display changes between three colors, depending on the state.

8 Battery status

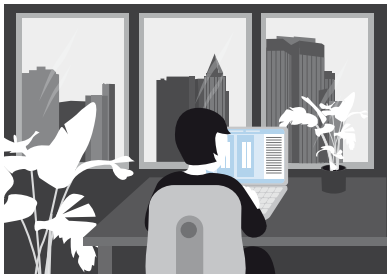


The battery symbol indicates the charge status of the batteries. The graphical representation depends on the device and battery type (primary cells or accupack).

Color	Meaning
green	The battery is fully charged.
yellow	The battery is about half discharged.
red	The critical level is reached. The battery symbol flashes red. Additionally, a message appears in the panel, the system window (“Messages” tab) and the status bar.

The remaining accupack capacity is additionally displayed for ew G3 and 2000 series devices.

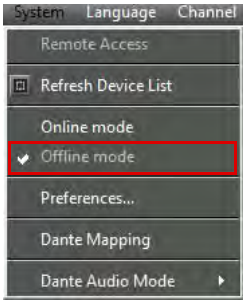
Configuring the system in Offline Mode



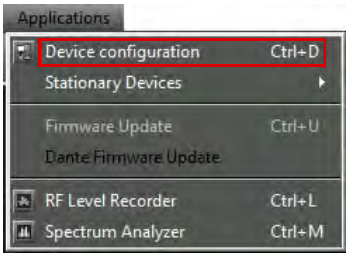
The WSM allows you to configure your wireless system in Offline Mode where and whenever you want. The set parameters can directly be transferred to your Sennheiser devices before the show. This helps you to save valuable set-up time at the production venue.

Creating a new configuration

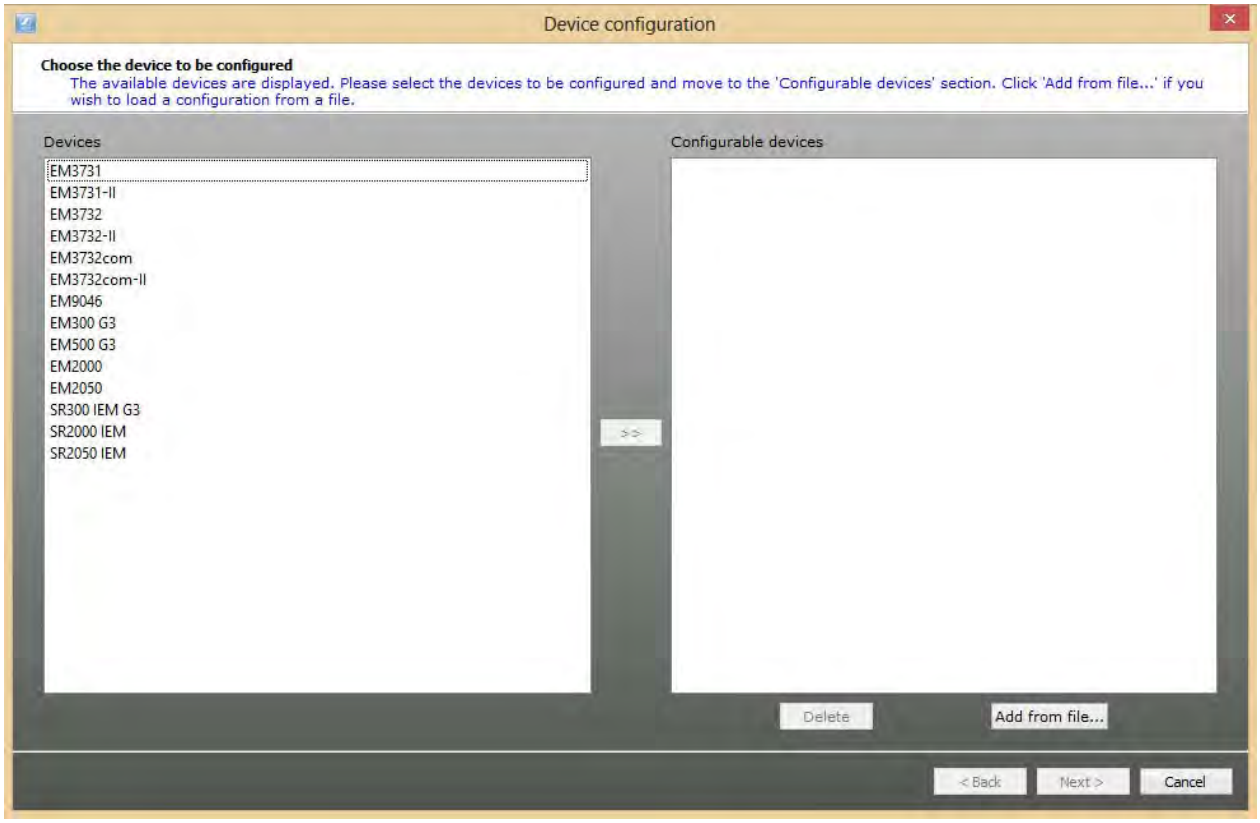
Changing to Offline Mode



▶ Click on "System" > "Offline Mode".
If devices are connected, the link is interrupted. The corresponding panels will be highlighted in gray. The devices in the "Devices" tab of the system window are marked with a red "x".



▶ Click on "Applications" > "Device configuration".
The following window opens.



Adding devices to the list

The window contains two lists. The left-hand list displays all WSM compatible devices. The right-hand list displays your current device selection.

To add devices to the list:

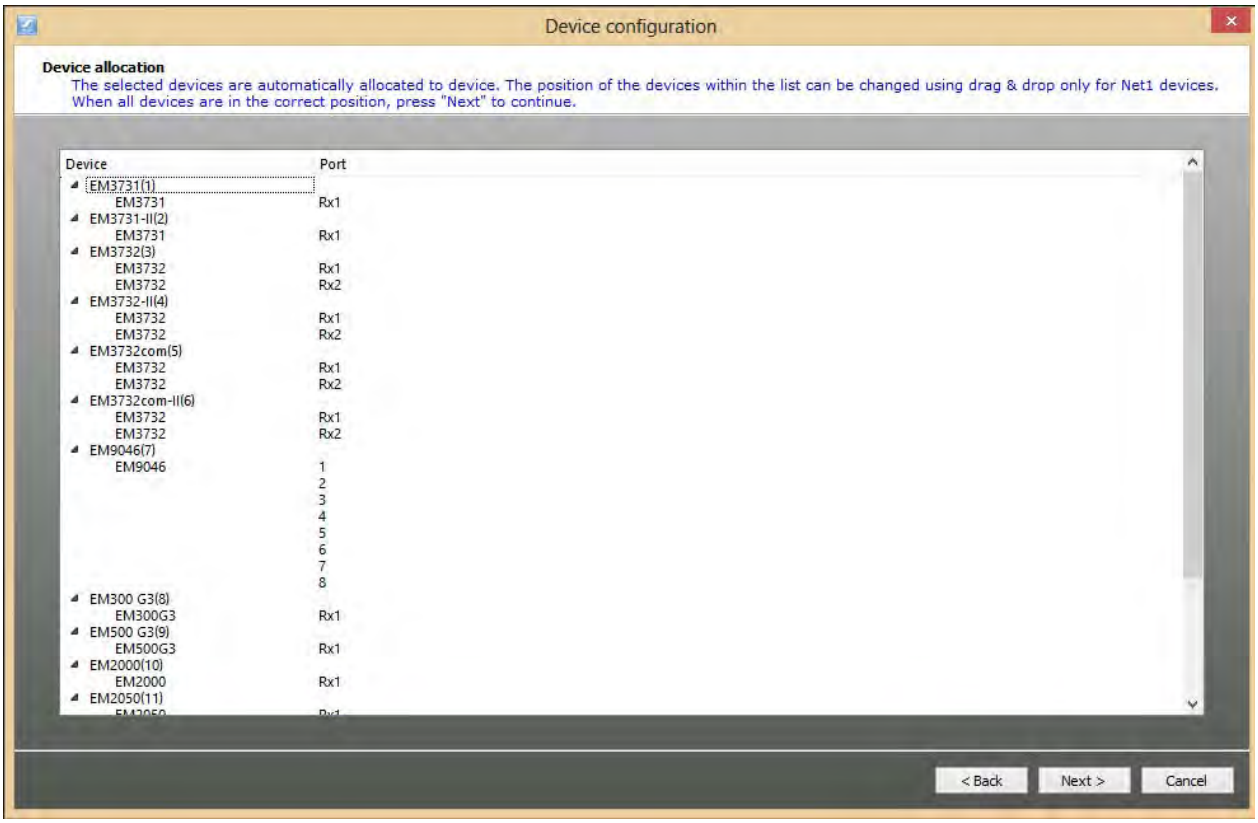
- In the left-hand list, click on a receiver or a transmitter (IEM).
- Click on ">>".
  The selected receiver or transmitter (IEM) appears in the right-hand list and is included in the system. Add any number of devices to your system.
- Click on "Next >".
  The following window appears.

Loading a list

If you wish to change an existing list, you can load this list ("Add from file...") and then add devices to or delete devices from the list.

Devices which occupy two ports are displayed twice.

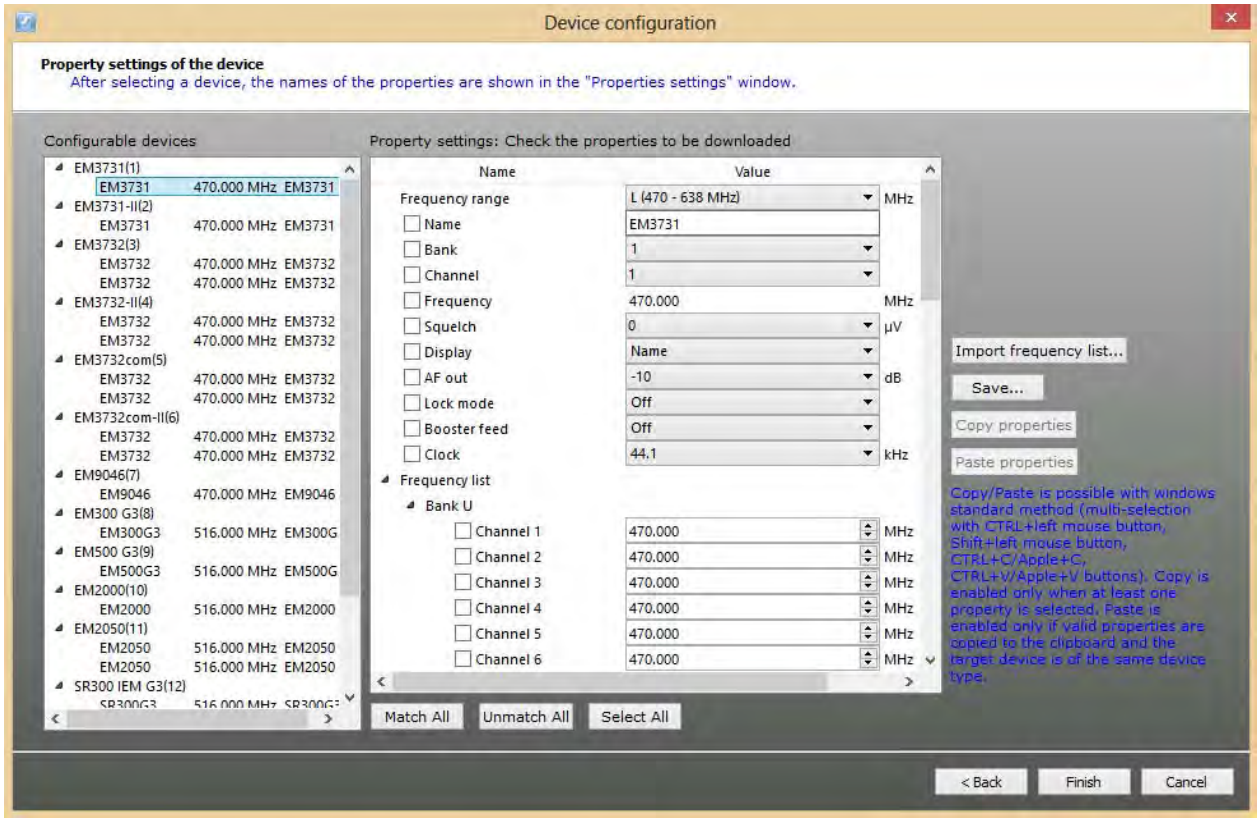
ew G3/2000 series	EM 3732/EM 3732 Command	EM 9046
• RX 1 • RX 2	• RX 1 • RX 2	• 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8



To assign a receiver or transmitter (IEM) to a different device or port:

- ▶ Click on the receiver or transmitter (IEM).
- ▶ Keep the mouse button pressed and drag your selection to the desired port.
  The receiver or transmitter (IEM) appears in the corresponding position in the list.
- ▶ After you have assigned all receivers or transmitters (IEM), click on "Next >".
  The following window appears.

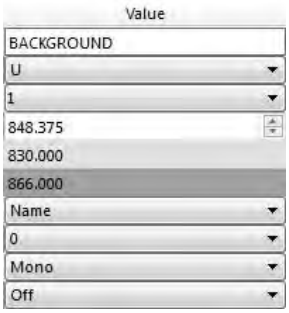
Pre-configuring device parameters



Changing device parameters

- ▶ In the left-hand list, click on a device.
  The "Property settings" list displays the device parameters.
  The parameters displayed depend on the type of the device.
  The left-hand column (Name) displays the device parameters. The two columns on the right of it display the corresponding values (Value) and units (Unit).

- If you are changing the settings for the "Frequency", "Bank" and "Channel", the "Frequency" setting is prior-ranking. The bank and channel are selected according to the selected frequency.
- Specific information on the parameters can be found in the instruction manuals for the devices.
- The settings of individual devices can also be changed later when the devices are already connected (see "Changing the parameters of a device" on page 91).



- Click on the entry field or on the arrow next to the corresponding parameter.
  A flashing cursor or a selection list appears.
- Enter the desired value or select a value from the selection list.

Make sure that the device type and the frequency range match. Information on the frequency range is given on the type plate.

Copying parameters and pasting them to other devices

- Click on the device whose parameters you want to copy.
- Click on "Copy Properties" to copy the parameters.
- Click on the device to which you want to assign the copied parameters.
- Click on "Paste Properties" to paste the copied parameters to the device.

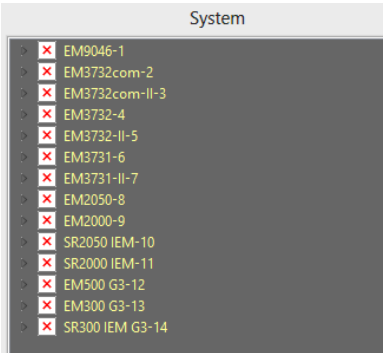
Saving parameters

- Click on "Save".
  The "Save File" dialog box appears.
- Select the folder in which you want to save the file.
- In the dialog box, enter a name for the "wsm" file.
- Click on "Save".
  The data is saved. The dialog box closes.

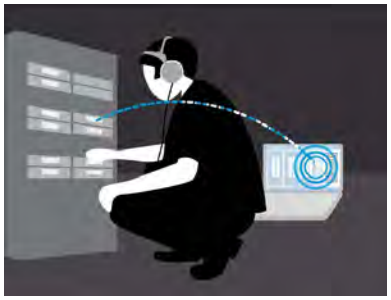
After you have set all parameters

- Click on "Finish".
  The dialog box closes.

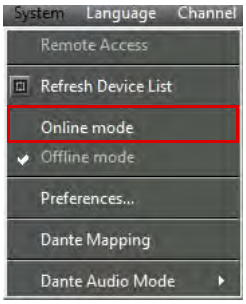
  In the "Device" tab of the system window, the configured devices appear. To the left of them a red "x" is shown.



Transferring the configuration to the devices

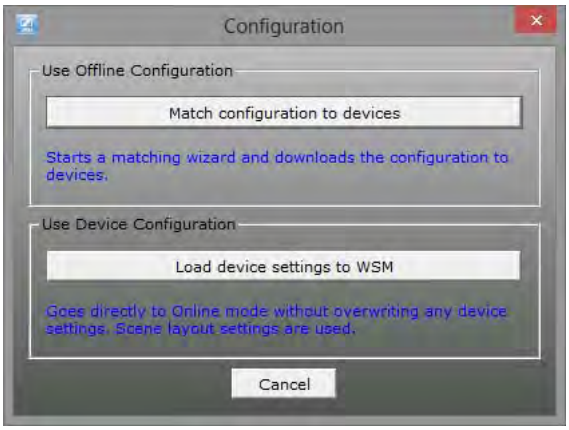


- Connect the devices.
- Switch on all devices.



To change to Online mode:

▶ Click on "System" > "Online mode".
The following window appears.



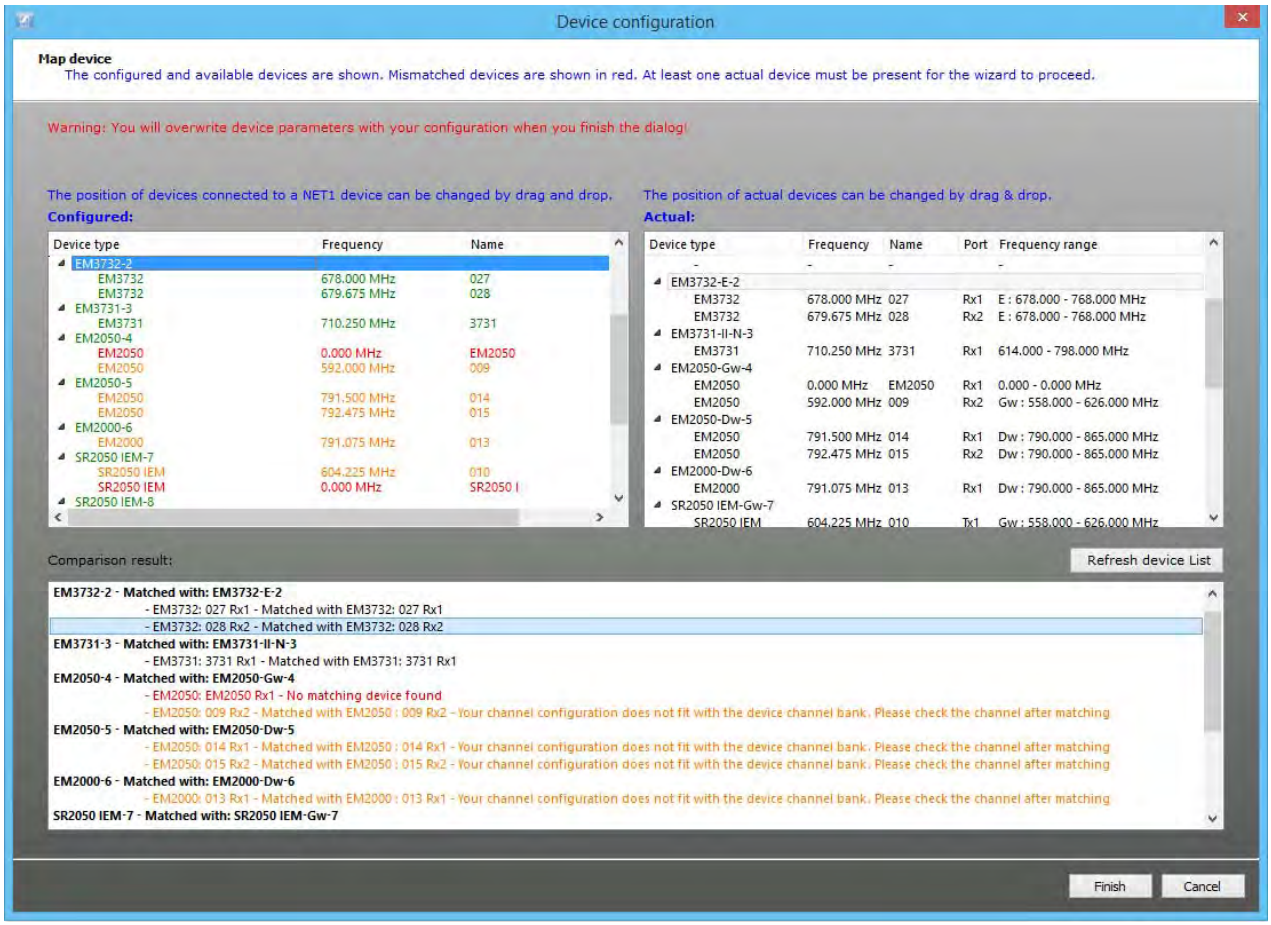
You can use either the parameters from the offline configuration or the device parameters.

If you want to use the device parameters:

▶ Click on "Load device settings to WSM".
The WSM takes over the device parameters. The offline configuration is not used in this case.

If you want to transfer the set parameters from the offline configuration:

▶ Click on "Match configuration to devices"
The connected devices are searched. The following window appears.



The left-hand list displays the pre-configured devices (“Offline Configuration”). The right-hand list displays all currently connected devices. The device assignment appears in the “Comparison result” window.

The assigned devices are highlighted in the list on the left.

Color	Meaning
green	Configuration matches the connected device.
orange	Channel bank of the device does not match the configuration. A manual check of the device is necessary.
red	No suitable device found (e.g. differing frequency range).
black	Device found on a different port and assigned automatically.

If devices are marked black or red, you can:

- re-connect the receivers according to the configuration,
- change the configuration (“< Back”)

To connect the devices according to the configuration:

▶ Connect all devices marked black to the corresponding ports.

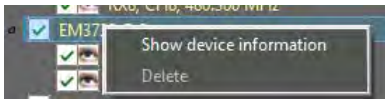
▶ Click on “Refresh Device List” to update the list.

Updating the firmware of the devices

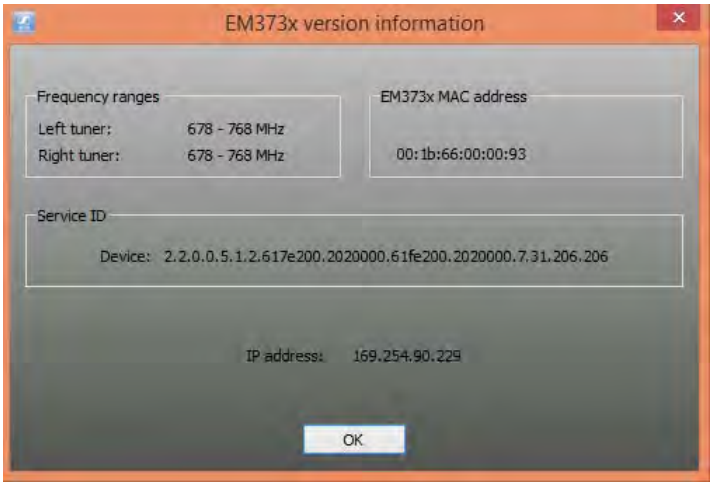
The "Wireless Systems Manager" allows you to update the firmware of the connected Sennheiser devices.

Displaying the firmware versions of the devices

You can display the firmware versions of the connected devices.



Example EM 3732:



Display	Meaning
Frequency ranges	Displays the left tuner and right tuner frequency range
MAC address	Displays the MAC address of the device
Service ID	Displays the service ID of the device
IP address	Displays the IP address of the device

▶ Click on "OK".
The dialog box closes.

Downloading the latest firmware update from the Internet

Sennheiser is continuously improving the WSM software. We therefore recommend that you register on our website at www.sennheiser.com. You can then regularly receive a newsletter providing information on the WSM and the latest firmware versions.

▶ Select the current firmware package (SENNPKG file) on the Sennheiser website at www.sennheiser.com and start the download.

▶ Click on "Open".
The file is automatically saved in the "New Releases" subfolder of the program folder. If this folder already contains a file, this file is moved to the "Archive" folder.

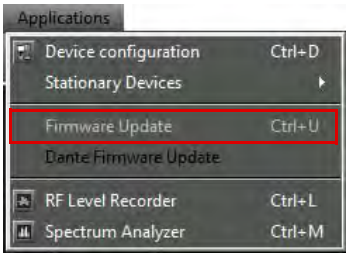
Preparing the firmware update

Only the firmware is updated, the device settings remain the same.

Devices that are marked with a "U" in the "Devices" tab of the system window have an outdated firmware that must be updated.

To prepare the firmware update:

- Switch on all receivers and transmitters.
  Switched-off devices will be ignored during update.
- Click on "Applications" > "Firmware Update".
  The "Firmware Update" window opens.



If there is a new firmware version available in the "New Releases" folder of the program folder, it is displayed in the "The selected firmware package is:" field.
You can select a firmware package (SENNPKG file) for your Sennheiser devices.

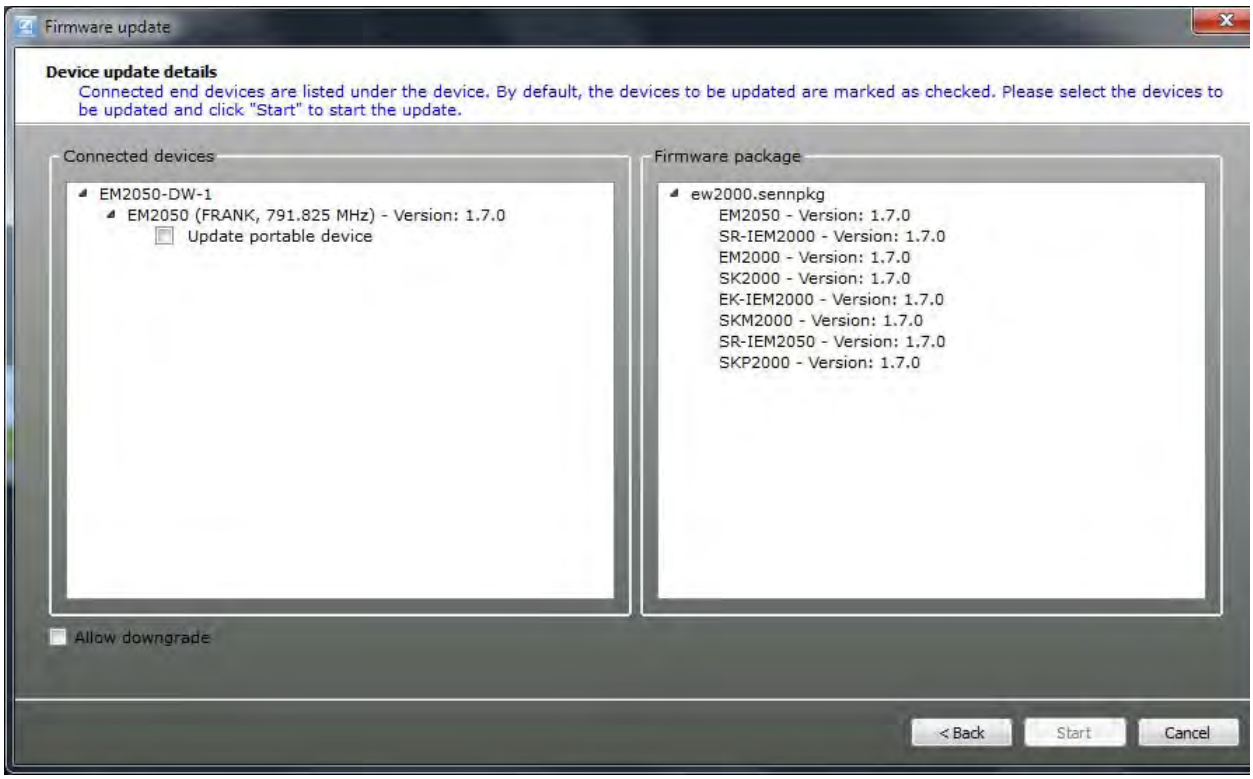
To use the firmware version from the "New Releases" folder:

- Click on "Next >".
  The connection to the devices is checked.

To use another version:

- Click on "Choose...".
  A dialog box appears.

- ▶ Select the desired SENNPKG file and confirm by clicking on "OK".
  The dialog box closes.
- ▶ Click on "Next >".
- ▶ The connection to the devices is checked.



The "Firmware package" box on the right displays all available firmware versions from the selected SENNPKG file. The "Connected devices" box on the left displays the corresponding connected devices.

Devices with an older firmware version are automatically ticked.

To not update the firmware in a device:

- ▶ In the "Connected devices" window, click on the check box of the device.
  The tick is removed. The firmware is not updated.

If you want to transmit an older firmware version to a device:

- ▶ Click on the "Allow downgrade" check box.
  A tick appears.
- ▶ In the left column, click on the check box of the device.
  A tick appears. The older firmware version will be transmitted to the devices during firmware update.

Portable Sennheiser transmitters (see page 4) can be updated via their associated receivers (via the infrared interface).

CAUTION! **Risk of data loss if transfer is interrupted during firmware update!**

Data may be lost if the transfer is interrupted. The devices may also be damaged as a result.

- When updating the firmware, do not interrupt any device connection to the stationary devices.
- Do not disconnect power from the devices. Preferably use fully charged batteries for the portable devices!
- Since the updating process takes about 40 seconds, firmly position the portable devices in front of the infrared interface.

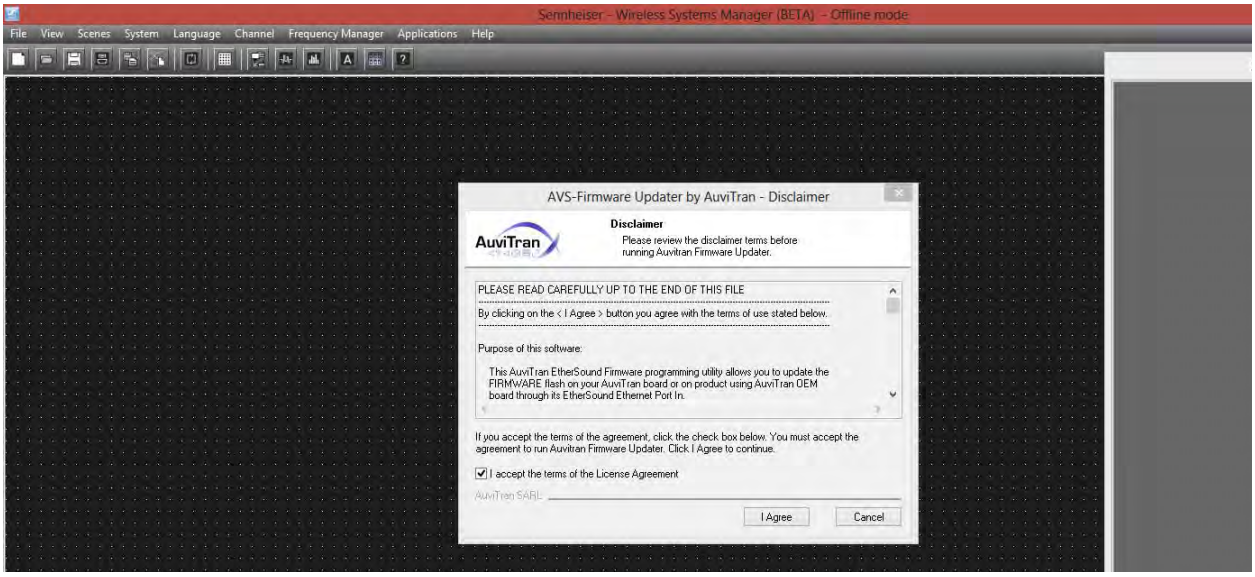
To start the firmware update:

- Click on ''Start''.
- Follow the instructions of the wizard.

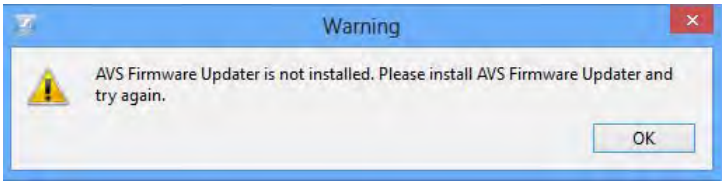
Dante firmware update

The Dante firmware is updated using the ''AVS Firmware Updater''. The ''AVS Firmware Updater'' is provided by AuviTran (www.auvitran.com) and must be installed on your computer in order to update the Dante firmware.

- Click on ''Applications'' > ''Dante Firmware Update''.
  If the ''AVS Firmware Updater'' is installed, it is launched and the Dante firmware is updated.



If the ''AVS Firmware Updater'' is not installed, the following warning is displayed:



For detailed information on updating the Dante firmware, please visit the ''Downloads'' area on the AuviTran website.

Frequency management

There are two types of frequency management:

- "Easy Setup" frequency management allows to coordinate unused frequencies for small multi-channel systems and to allocate the frequencies to the devices.
- "Professional Setup" frequency management allows to coordinate unused frequencies for large multi-channel systems and to allocate the frequencies to the devices.

Easy Setup (see page 33)	Professional Setup (see page 41)
You can use "Easy Setup" for an ad-hoc on-site installation in online mode.	You can use "Professional Setup" for an ad-hoc on-site installation in online mode and for planning an installation in offline mode. In both cases, licenses, licensable areas and legal regulations can be taken into account in the coordination.
"Easy Setup" can be performed with or without a frequency preset scan. During the frequency preset scan ... • the factory preset frequencies (presets) and • the frequencies stored in the channel bank "U" of the selected receiver are checked.	"Professional Setup" can be performed with or without a frequency scan. During the frequency scan ... • the complete spectrum of the selected frequency range is checked.

"Easy Setup" frequency management

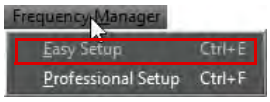
Individual device parameters can also be configured after "Easy Setup" (see "Working with panels" on page 76).

Launching the "Easy Setup" frequency management

▶ Deactivate the RF signal (RF Mute) of all portable transmitters for which you want to find unused frequencies.

The WSM automatically deactivates the RF signal of connected stationary transmitters.

▶ Switch on all possible sources of interference (e.g. light sources, video walls) and all other transmission links.



▶ Click on "Frequency Manager" > "Easy Setup".

▶ Follow the instructions of the wizard.

"Easy Setup" with or without frequency preset scan

You can allocate unused frequencies in various ways:

- "Preset Scan with portable receiver (EK IEM)":
  To find occupied as well as unused frequencies in the current vicinity of the system, perform a frequency preset scan.
- "Continue without Scan":
  To allocate already known unused frequencies to stationary devices, specify these frequencies without a frequency preset scan.

You can then allocate these unused frequencies to the portable devices.

Performing a frequency preset scan for monitoring systems

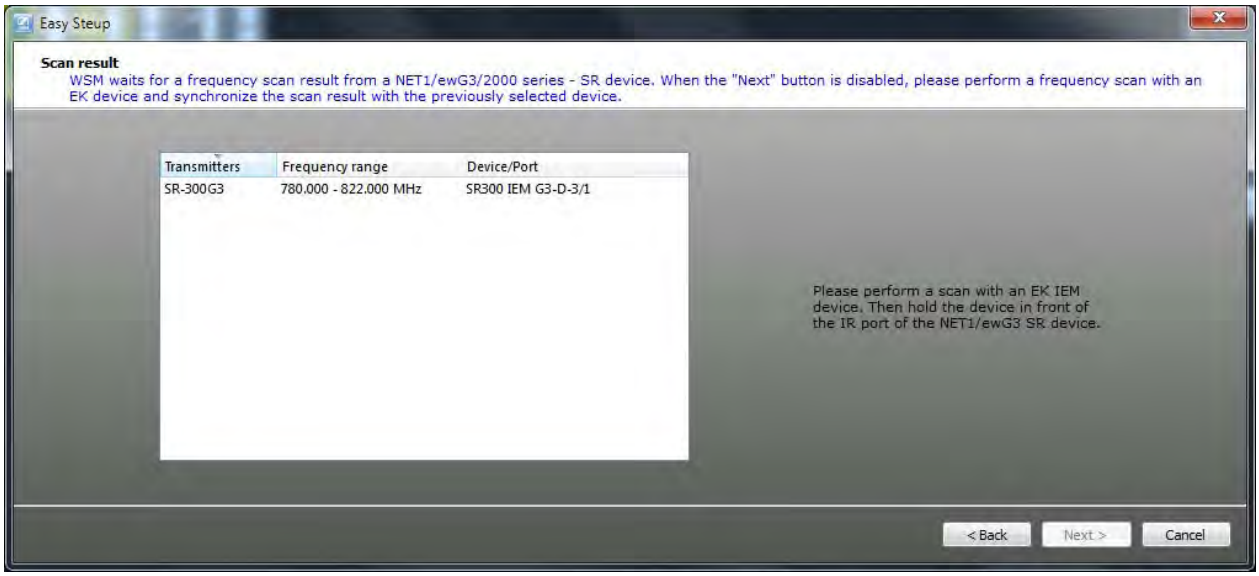
When operating both monitoring and microphone systems via the WSM, you first have to perform the frequency preset scan for the monitoring system.

The frequency preset scan is always performed for all frequencies in the selected channel bank.

The stationary transmitters of the corresponding frequency range are automatically switched off during the frequency preset scan.

Performing a frequency preset scan using a portable receiver

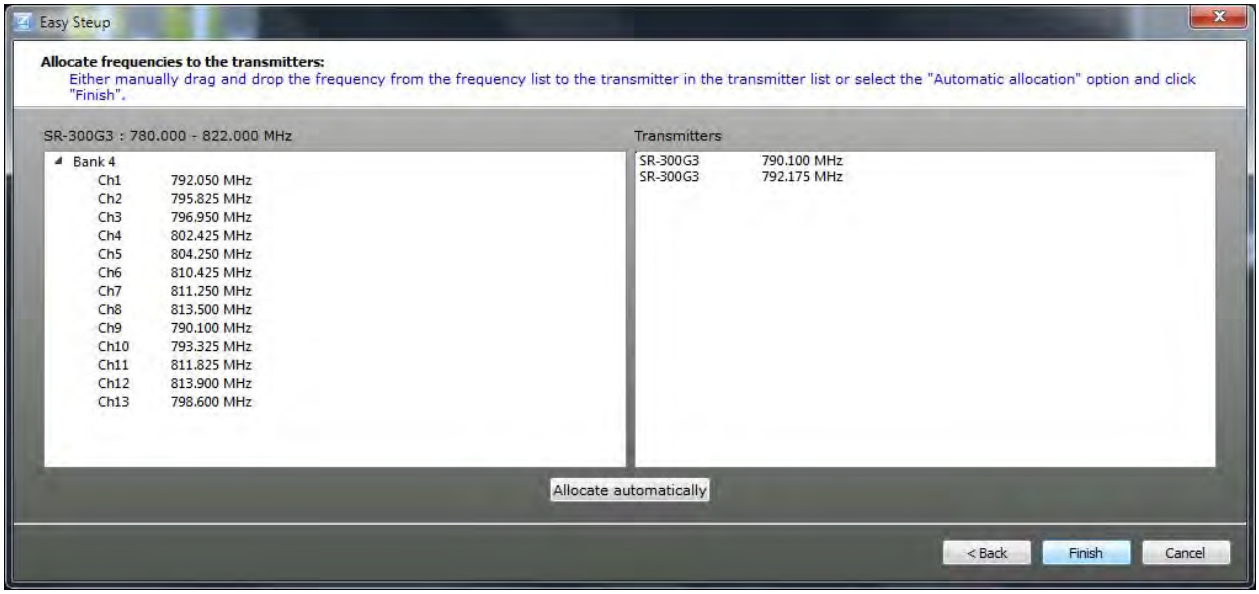
▶ The frequency preset scan is performed using a portable receiver. You then transfer the scan results to the associated stationary transmitter. The WSM retrieves the data from the transmitter.



- ▶ Before starting the frequency preset scan, switch off all portable transmitters of your system. Otherwise, frequencies used by switched-on transmitters will not be displayed as ''unused''.
- ▶ Start the frequency preset scan on the receiver (see the instruction manual of the receiver).

Allocating frequencies to stationary transmitters

You can allocate frequencies automatically or manually.

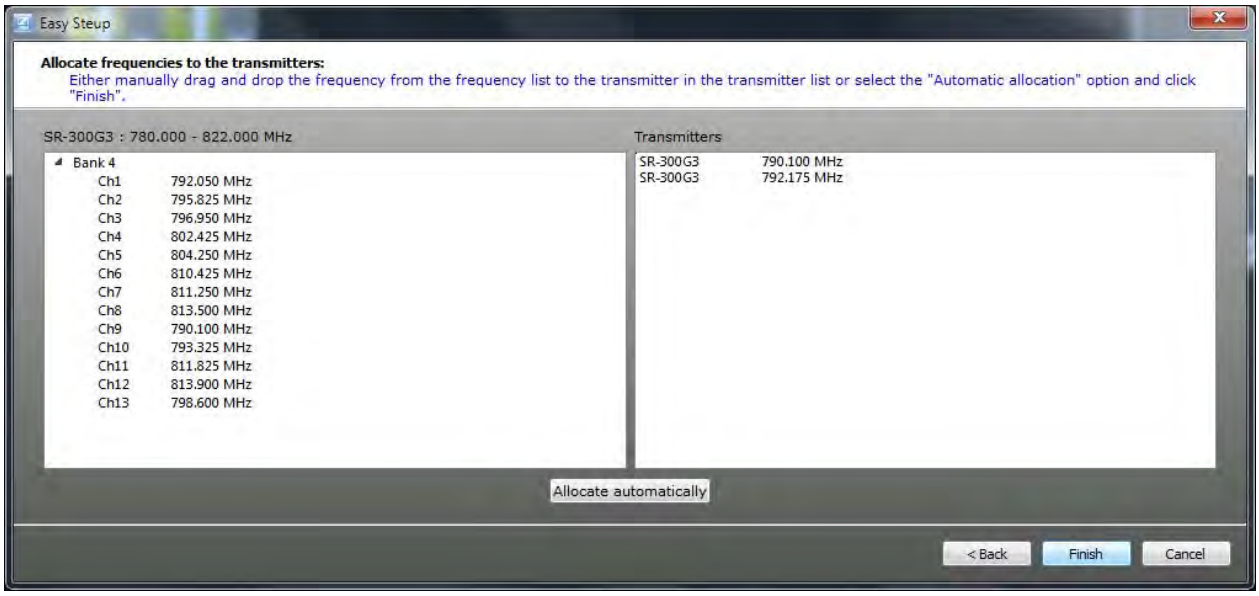


- Automatic allocation:
  If you have connected more transmitters (IEM) from one frequency range than free channels are available in one channel bank, the RF signals of the surplus transmitters (IEM) are muted.
- Manual allocation:
  If you assign the same frequency to several transmitters (IEM), only the first transmitter with this frequency is transmitting. The RF signals of the surplus transmitters are muted.

Allocating frequencies for a monitoring system without a frequency preset scan

Allocating frequencies to stationary transmitters

You can allocate frequencies automatically or manually.



- Automatic allocation:
  If you have connected more transmitters (IEM) from one frequency range than free channels are available in one channel bank, the RF signals of the surplus transmitters (IEM) are muted.
- Manual allocation:
  If you assign the same frequency to several transmitters (IEM), only the first transmitter with this frequency is transmitting. The RF signals of the surplus transmitters are muted.

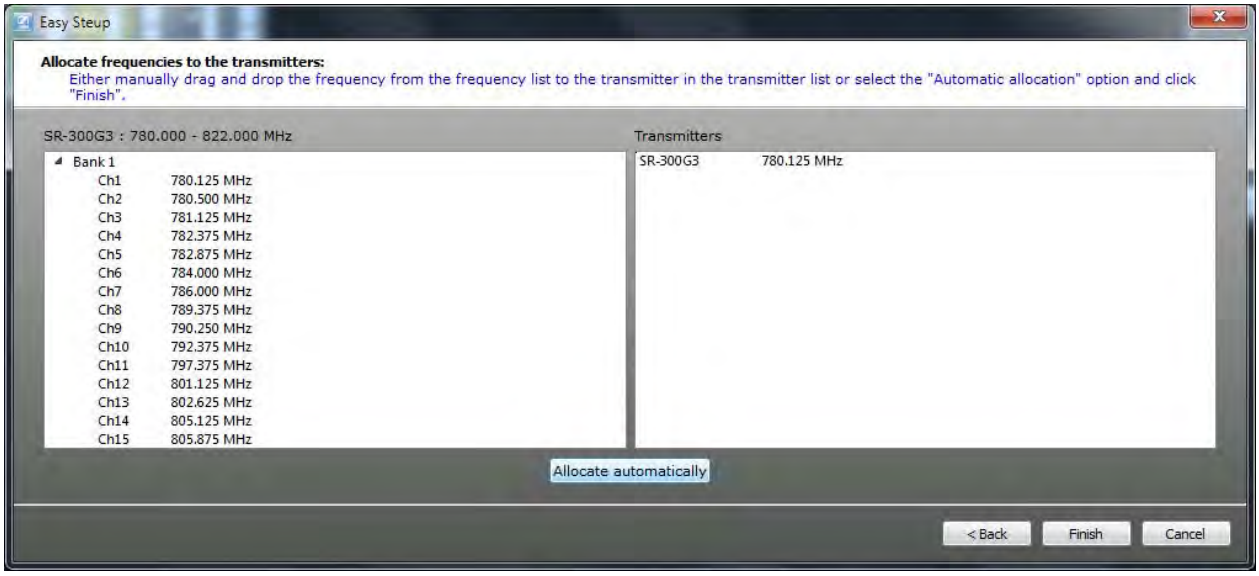
Performing a frequency preset scan for microphone systems

When operating both monitoring and microphone systems via the WSM, you first have to perform the frequency preset scan for the monitoring system.

The frequency preset scan is always performed for all frequencies in the selected channel bank.

Allocating frequencies to stationary receivers

You can allocate frequencies automatically or manually.



- Automatic allocation:
  If you have connected more receivers from one frequency range than free channels are available in one channel bank, the WSM re-assigns the last frequency assigned several times.
- Manual allocation:
  You can assign the same frequency to several receivers.

Allocating frequencies for a microphone system without a frequency preset scan

When you allocate frequencies without a frequency preset scan, interference with transmitters in the vicinity of the system may result.

Allocating frequencies to stationary receivers

You can allocate frequencies automatically or manually.

- Automatic allocation:
  If you have connected more receivers from one frequency range than free channels are available in one channel bank, the WSM re-assigns the last frequency assigned several times.
- Manual allocation:
  You can assign the same frequency to several receivers.

Defining, adding and exporting new frequency ranges for stationary devices

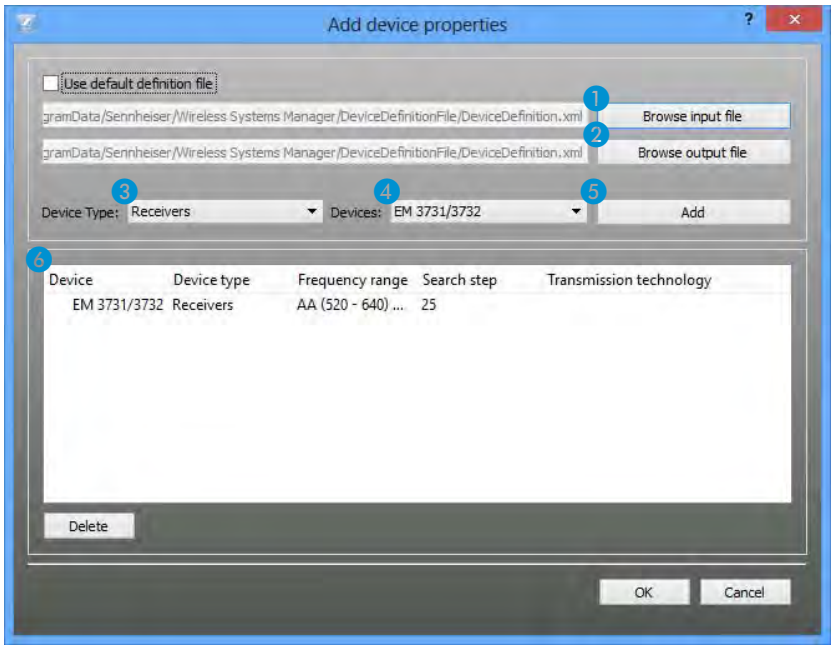
The ''Stationary Devices'' menu item in the ''Application'' menu allows you to define, add and export new frequency ranges for existing stationary devices.

The new frequency ranges are saved, together with the data of the frequency range definition file (xml file) supplied with the WSM, as a new file under a new file name. This new frequency range definition file can be edited, imported and exported.

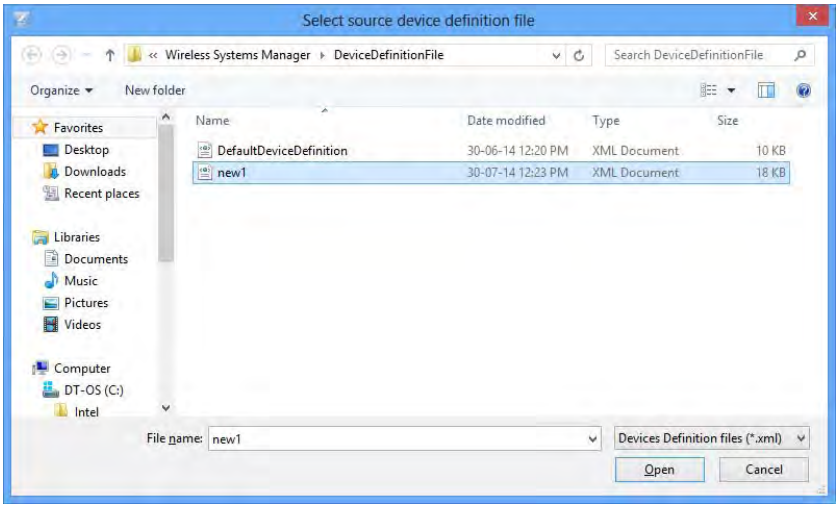
Using the commands ''Generate configuration file''; ''Import configuration file'' and ''Export configuration file'', you can create a new frequency range definition file and import or export a frequency range definition file.

Creating a new frequency range definition file

▶ Click on ''Stationary Devices'' > ''Generate configuration file''.
The ''Add device properties'' window opens.



▶ Click on "Browse input file" ❶.
The "Select source device definition file" window opens.



▶ Select the frequency range definition file.

▶ Click on "Browse output file" ❷.

▶ The file selection window opens.

▶ Select a folder and enter a name for the frequency range definition file you want to create.

▶ From the "Device type" drop down list ❸, select the desired device type (e.g. "Receivers" or "Transmitters").

▶ From the "Devices" drop down list ❹, select the desired device (e.g. EM 9046).

▶ Click on "Add" ❺ to define a new frequency range for the selected device.
The following dialog opens:

▶ In the "Frequency suffix" field ①, enter an alphanumeric value.

▶ Enter the minimum frequency of the new frequency range in the "Min. frequency" field ②.

▶ Enter the maximum frequency of the new frequency range in the "Max. frequency" field ③.

▶ Select the desired search step from the "Search step" drop down list ④.

▶ The default (and minimum) search step is 25 kHz. The search step can be incremented in multiples of 25.

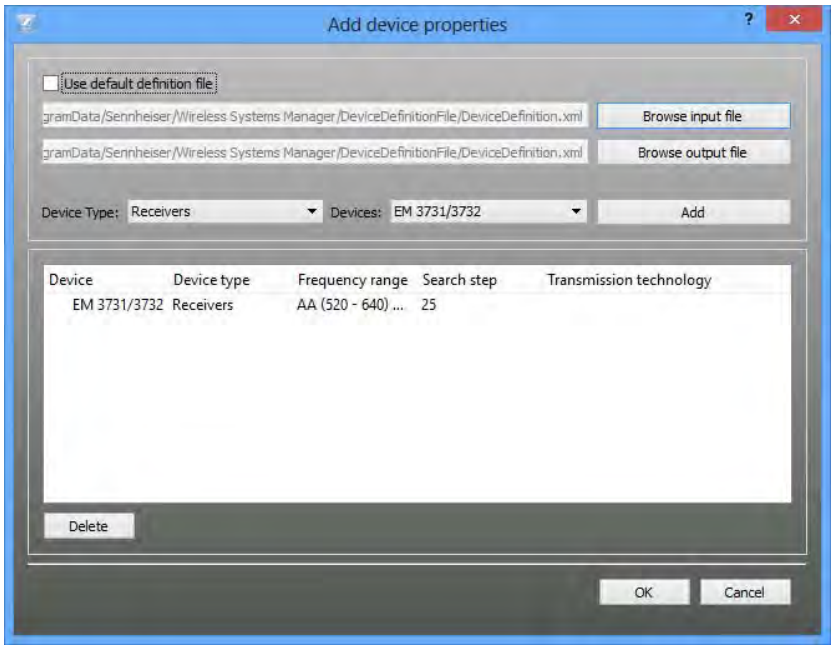
The "Frequency string" ⑤ displays all the values entered in the fields.

▶ Click on "OK".
The newly defined frequency range is added to the list area ❻ of the "Add device properties" window.

The "OK" button is only enabled when all fields are valid.

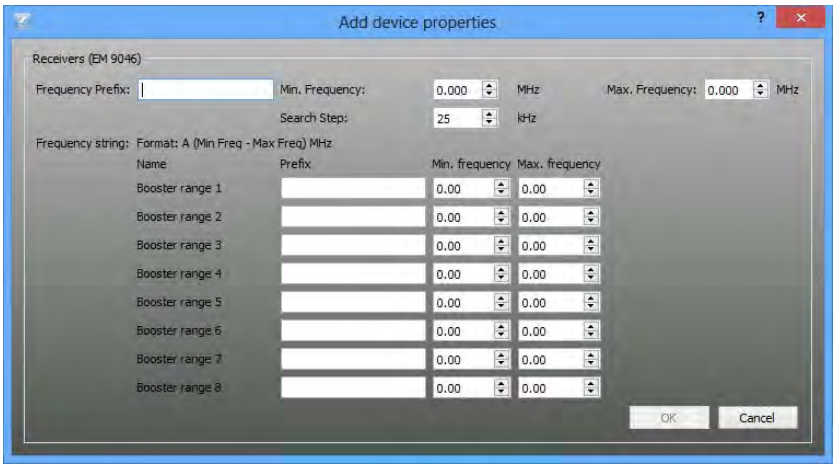
You can delete newly added frequency ranges from the list area 6 by clicking on "Delete" 7.

If the "Select default definition file" check box 8 is activated, the default frequency range definition file is loaded.



▶ In the "Add device properties" window, click on "OK".
The new frequency ranges are added to the frequency range definition file.

You can define frequency ranges for all eight booster ranges of an EM 9046 receiver.



If the selected device is a transmitter, the "Add device properties" window contains an additional drop down list called "Transmission technology", from which you can select the transmission technology to be used.

Importing a frequency range definition file

To import an frequency range definition file (xml file):

- Click on "Stationary Devices" > "Import configuration file".
  The file selection window opens.
- Select the desired frequency range definition file and click on "OK".
  The frequency range definition file is imported and its frequency ranges are available for use.

Exporting a frequency range definition file

To export an frequency range definition file (xml file):

- Click on "Stationary Devices" > "Export configuration file".
  The "Save device configuration file" window opens.
- Select a folder and enter a name for the frequency range definition file you want to export.

"Professional Setup" frequency management

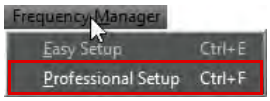
For information on the differences between "Easy Setup" and "Professional Setup", refer to the chapter "Frequency management" on page 33.

Launching the "Professional Setup" frequency management

- Deactivate the RF signal (RF Mute) of all portable transmitters for which you want to find unused frequencies.

  The WSM automatically deactivates the RF signal of connected stationary transmitters.

- Switch on all possible sources of interference (e.g. light sources, video walls) and all other transmission links.

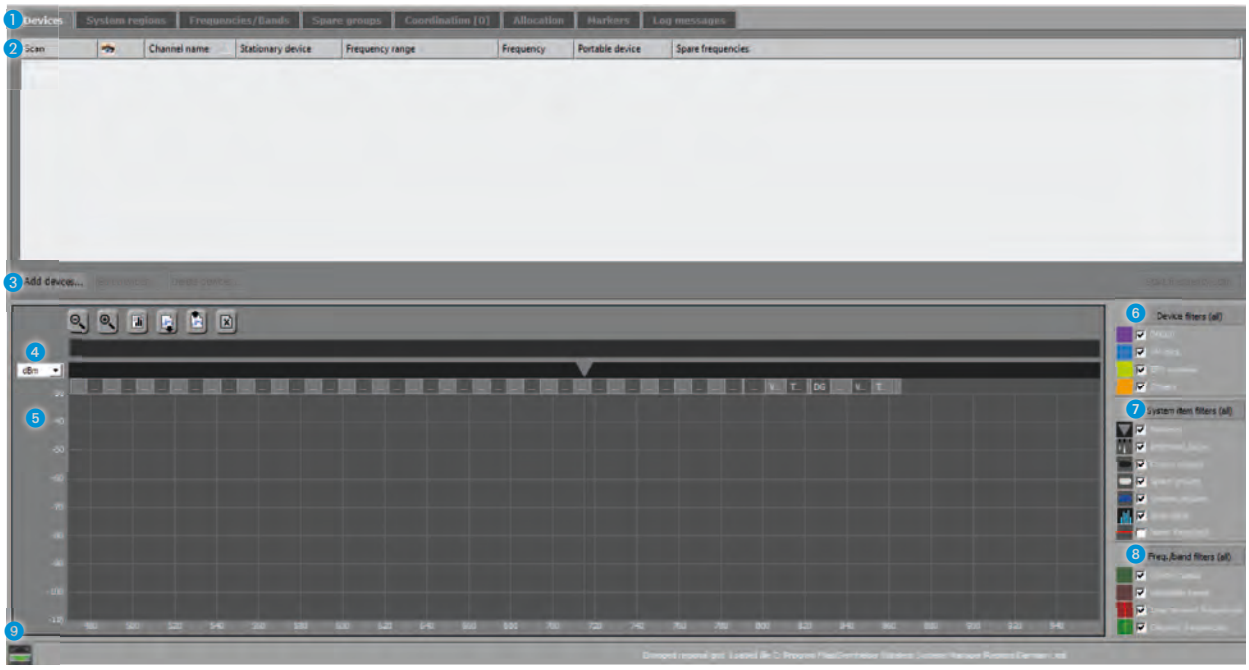


- Click on "Frequency Manager" > "Professional Setup".
  The "Professional Setup" window opens.

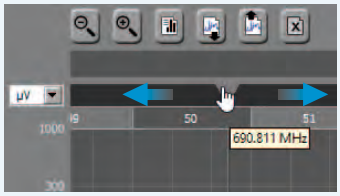
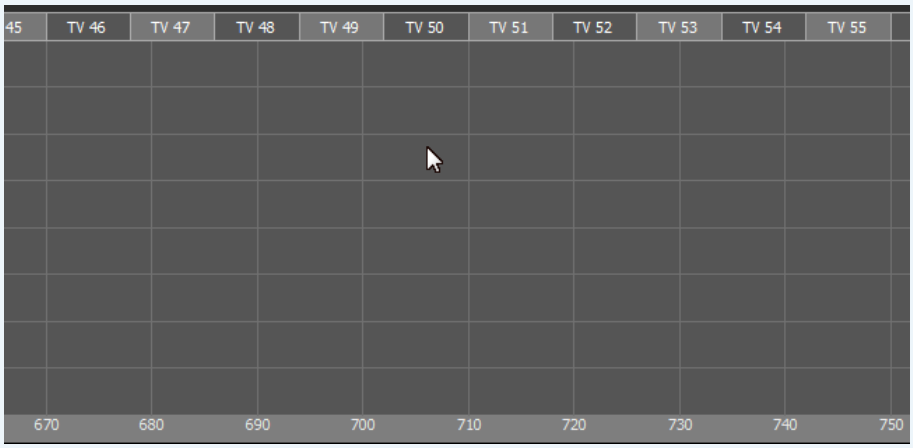
  The following gives an overview of the tabs and setting possibilities of the "Professional Setup" window.

  Information on the regional frequency grid, on performing/importing a frequency scan and on analyzing the frequency spectrum can be found in the chapter "Loading the regional frequency grid, performing a frequency scan and analyzing the frequency spectrum" on page 68.

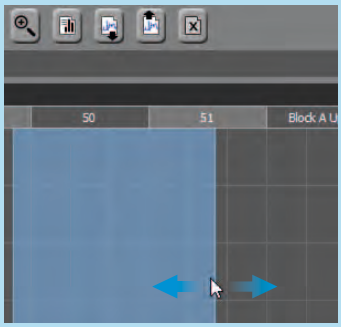
Overview of the "Professional Setup" window



Element	Function
1 Tabs: Devices", "System regions", etc.	For detailed information on the tabs, please refer to the section "The tabs" on page 45.
2 Upper window area	Displays the devices, system regions, etc. in list form (the representation displayed depends on the active tab).
3 Buttons area: "Add devices...", "Edit devices..." and "Delete devices...", "Start frequency scan"	The buttons available depend on the active tab. The "Devices" tab, for example, offers you the following options: • Setting new devices • Editing already existing devices • Deleting devices • Starting a frequency scan
4 List box and buttons of the graphical overview	dB Adjusts the RSSI scale of the y-axis: µV, dB, dBm Zooms out/zooms in (shortcut key Win: Ctrl + ↑/↓, Mac: cmd + ↑/↓) Generates a report Imports a frequency scan Exports a frequency scan Deletes a frequency scan

Element	Function
5 Graphical overview	Displays devices, markers, intermodulation products, system regions, usable and unusable frequency bands and frequencies. To navigate horizontally (shortcut key Win: Ctrl + ← →, Mac: cmd + ← →):  To zoom the visible area in or out:  To move the current position to the left/right:  When clicking on "Add freq./band..." in the "Frequencies/Bands" tab or on "Add marker..." in the "Markers" tab, the frequency at the current position of the movable triangle is taken as the default value. To quickly set discrete/interference frequencies by clicking in the graphical overview: 

Setting ...	Win	Mac
a discrete frequency, tolerance +/- 0 priority: medium	Click + CTRL or Click + Alt	Click + cmd or Click + Alt
an interference frequency, tolerance +/- 0 priority: blocked	Click + CTRL + Shift or Click + Alt + Shift	Click + cmd +Shift or Click + Alt + Shift

<table>
<tr><th>Element</th><th>Function</th></tr>
<tr><td></td><td>You can also set a frequency by click-dragging a rectangle on the graphical overview:
<table>
<tr><th>Setting ...</th><th>Win</th><th>Mac</th><th>Tolerance</th></tr>
<tr><td>a discrete frequency calculated from the mean value (upper limit, lower limit) priority: medium</td><td>Click-drag + CTRL</td><td>Click-drag + cmd</td><td>mean value - lower limit</td></tr>
<tr><td>an interference frequency calculated from the mean value (upper limit, lower limit) priority: blocked</td><td>Click-drag + CTRL + Shift</td><td>Click-drag + cmd +Shift</td><td>mean value - lower limit</td></tr>
</table>
To quickly set usable and unusable frequency ranges by click-dragging a rectangle on the graphical overview:


<table>
<tr><th>Setting ...</th><th>Win/Mac</th></tr>
<tr><td>a usable frequency range, priority: medium</td><td>Click-drag + Alt</td></tr>
<tr><td>an unusable frequency range, priority: medium</td><td>Click-drag + Shift + Alt</td></tr>
</table></td></tr>
<tr><td>6 Filters for the graphical overview
8</td><td>Views/hides devices, items and frequencies/frequency bands in the graphical overview
By clicking on the “Device filters (all)“, “System item filters (all)“ or “Freq./band filters (all)“ buttons, you can view/hide the corresponding subentries in the graphical overview</td></tr>
<tr><td>9 “View toggle“ icon</td><td>Views/hides the graphical overview and the filters</td></tr>
</table>

The tabs

The "Professional Setup" window contains 8 tabs. The tabs 1 to 6 ("Devices" to "Allocation") are arranged from left to right in the most logical order for a live setup:

Devices

- Sets Sennheiser devices and custom devices and edits the device settings
- Saves devices including their channel names as configurations ("Save preset...")
- Scans the frequency range defined by the selected stationary receivers for signals (frequency scan) and detects used frequencies or interfering signals from extraneous sources (spectrum analysis)

System regions

- Defines system regions for devices that are spatially and temporally separated in order to avoid the calculation of intermodulation products
- Limits certain devices or device groups to a frequency range

Frequencies/Bands

- Sets prioritization levels for frequencies and frequencies bands to be taken into account in the frequency coordination (Priority: "Low", "Medium", "High")
- Marks frequencies and frequencies bands as unusable or being interfered with so that they can be excluded from the frequency coordination

Spare groups

- Determines spare frequency groups for the most important transmission links
- Requests a certain number of spare frequencies from the coordination while ensuring an efficient use of the frequency spectrum

Coordination

- Calculates intermodulation-free frequencies with different prioritization levels and optimally coordinates all frequency requirements

Allocation

- Allocates frequencies to channels

Markers

- Sets colored markers and labels them with names in order to mark different positions in the frequency spectrum

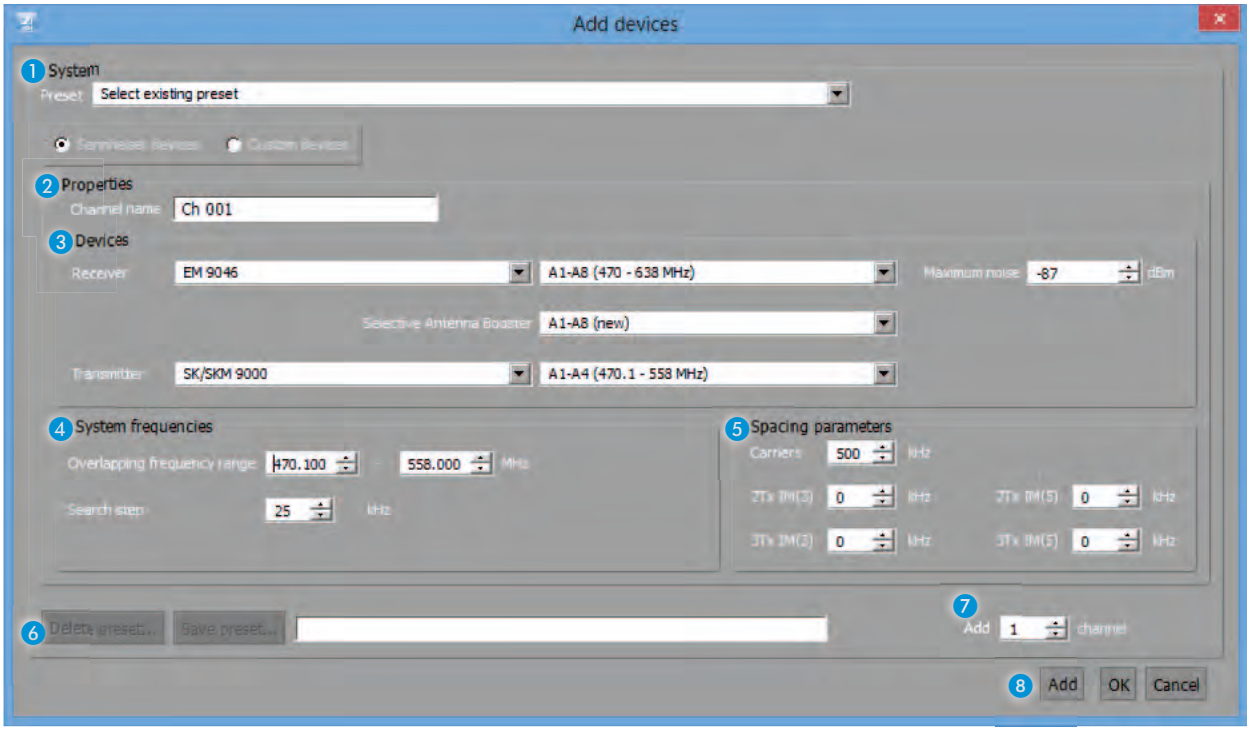
Log messages

- Displays information, warnings and errors

Devices – Setting and managing devices

Setting devices

▶ Click on "Add devices...".
The "Add devices" window opens:



▶ In the "System" area 1, decide whether you want to set Sennheiser devices or custom devices.

If you have already saved device presets (area 6), they can be selected from the "Preset" list box.

▶ In the "Properties" area 2, select the naming scheme for your channels ("Channel name").

If you use the default channel name "Ch 001" and enter a channel number > 1 in area 7 ("Add xx channel"), the channels are numbered consecutively. If, however, you enter an name into the "Channel name" field, all channels of the device will be assigned this name.

If you use Sennheiser devices:

▶ In the "Devices" area 3, first select your receiver.
The other list boxes in the "Devices" area 3 are filled in automatically.

▶ Adjust the settings in the list boxes according to your needs.
Depending on the selected transmitter/receiver combination, the list boxes in "System frequencies" area 4 are filled in automatically.

▶ If necessary, adjust the minimum frequency spacings 5.

▶ In area 7 ("Add xx channel"), select the desired number of channels.

▶ If required, save your entries as a preset (area 6).

Please note that the number of channels selected in area 7 will not be saved.

▶ Click on "Add" 8 to add devices to the "Add devices" window.
The "Add" button allows you to add further devices without closing the window.

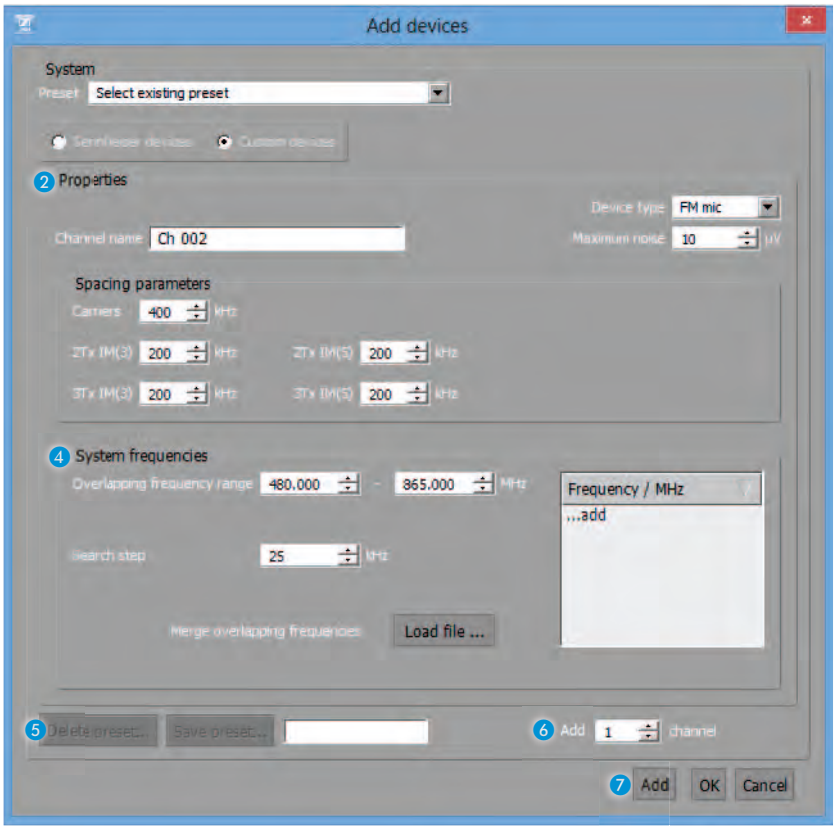
Please note that the number of channels of the particular device type is added to the device list displayed in the upper window area of the "Devices" tab.

▶ Exit the window by clicking on "OK".

Clicking on "OK" adds one device at a time and then closes the window. If you have added several devices by using the "Add" button, click on "Cancel" to close the window.

If you use custom devices:

The "Properties" area 2 looks different:



Inform yourself of the technical properties of the used radio system or work with the existing presets (see xml file in the folder ... Application Data\Sennheiser\Wireless Systems Manager\Configuration\Devices-Custom).

▶ Select a device from the "Device type" list box and specify its maximum noise level.

▶ If necessary, adjust the minimum frequency spacings.

▶ Adjust your settings in the "System frequencies" area 4.

▶ In area 6 ("Add xx channel"), select the desired number of channels.

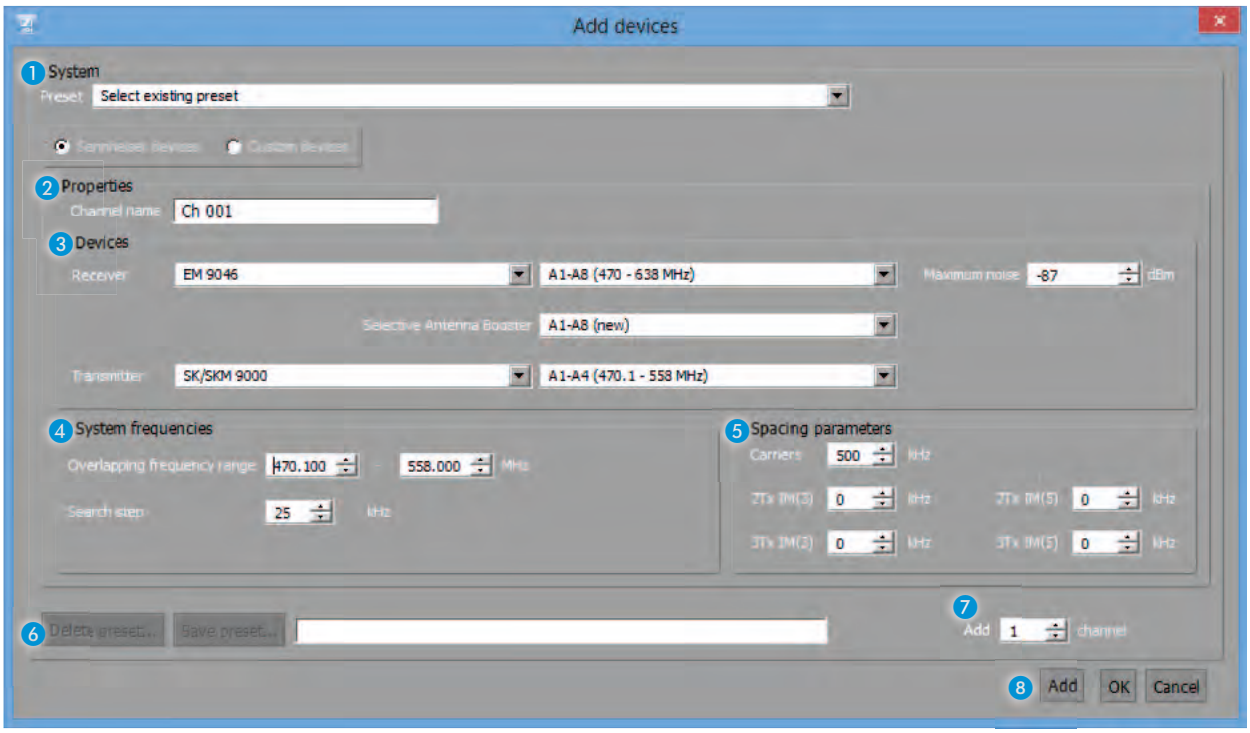
▶ If required, save your entries as a preset (area 5).

Please note that the number of channels selected in area 6 will not be saved.

▶ Add devices by clicking on "Add" 7 or exit the window by clicking on "OK".

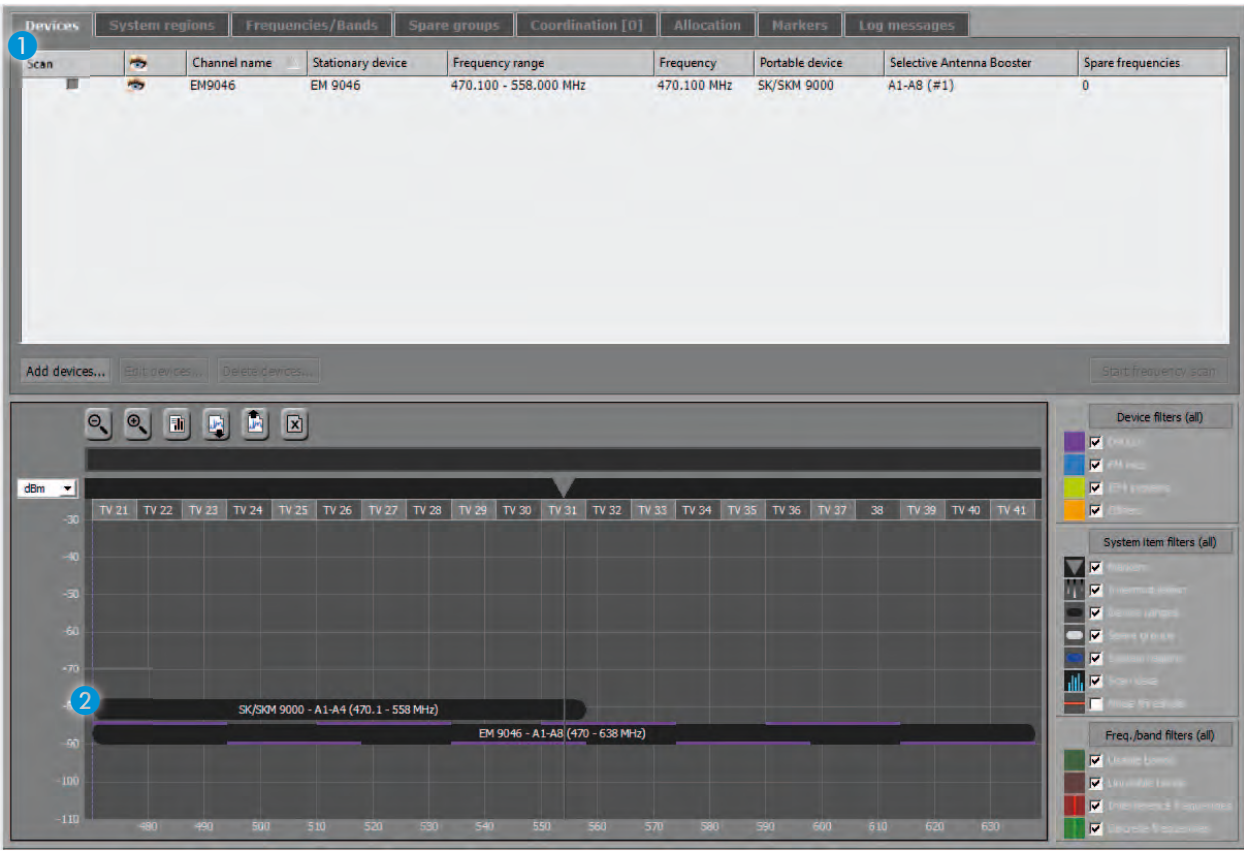
Example

You set the digital EM 9046 receiver together with 8 SK/SKM 9000 transmitters in the ''Devices'' area. In the ''Channel name'' field, you use the default setting ''Ch 001'':

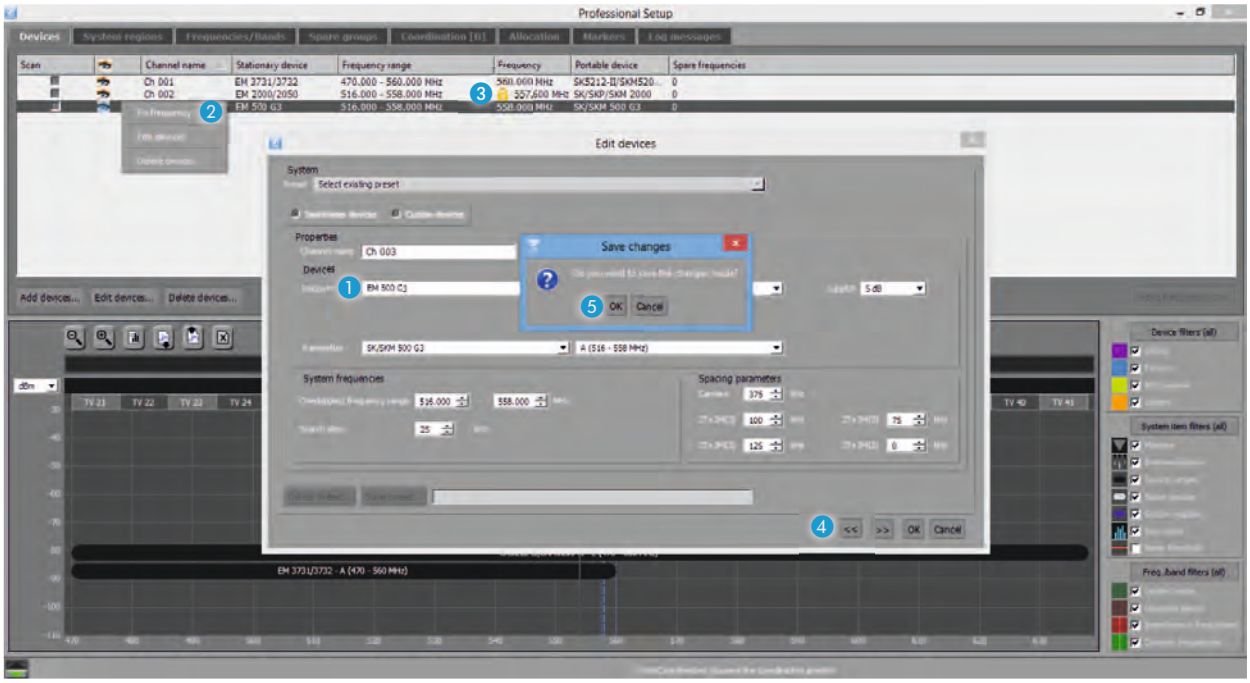


After confirming the ''Add devices'' window by clicking on ''OK'', the device list 1 is displayed in the upper window area of the ''Devices'' tab.

If the ''Device ranges'' check box is activated, the frequency range used by the devices is displayed as a black bar 2 in the graphical overview. The 8 booster ranges of the EM 9046 receiver are displayed as purple bars.



Editing device parameters



To edit channel names and other device parameters using the dialog window:

- From the device list, select a device and click on ‘‘Edit devices...’’.
- Edit the device parameters.

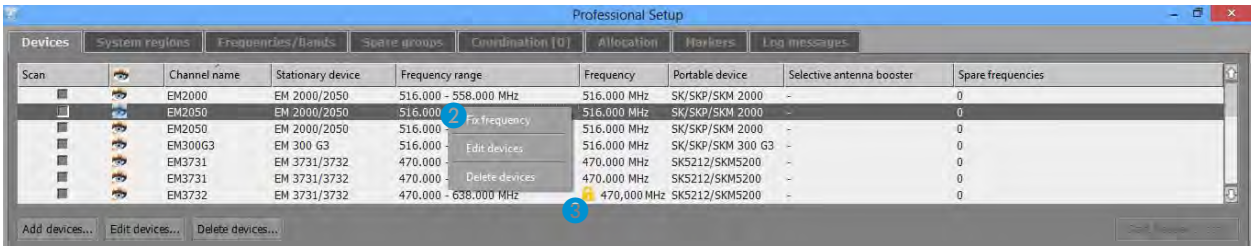
To edit the parameters of other devices when the "Edit devices" window is already open:

▶ Use the "<<" and ">>" buttons 4 to navigate to other devices.
Before you can edit other devices, you are asked to save the changes made to the current dialog window by clicking on "OK". 5.

Fixing the frequency of a device

You can fix the allocated frequency of a device so that the device cannot be allocated a different frequency during coordination.

To fix the frequency of a device:



▶ Right-click on a device in the device list and select "Fix frequency" from the shortcut menu 2.
If the frequency of a device is fixed, a lock icon appears next to the frequency of the device 3.

To "unfix" the frequency from the device:

▶ Right-click on the device and select "Unfix frequency" from the shortcut menu.

Deleting devices

▶ From the device list, select one or several devices and click on "Delete devices..." or right-click on a device and select "Delete devices" from the shortcut menu.

▶ Confirm the safety query "Do you want to delete xx device(s)?" by clicking on "OK".

Viewing/hiding devices in the graphical overview

▶ Activate/deactivate the "Device ranges" check box in the "System item filters (all)" area.

Viewing/hiding carrier frequencies in the graphical overview

▶ Activate/deactivate the corresponding check boxes in the "Device filters (all)" area.

Changing the sorting of the devices

▶ In the upper window area, click on one of the column headers "Scan", "", "Name", etc.
The devices are sorted in an ascending order according to the entries in the column, an upward pointing triangle appears in the column header: .

To sort the devices in a descending order:

▶ Click again on the column header.
A downward pointing triangle appears in the column header: .

Performing or importing a frequency scan

Information on performing or importing a frequency scan and on analyzing the frequency spectrum can be found in the chapters "Loading the regional frequency grid, performing a frequency scan and analyzing the frequency spectrum" on page 68 and "Analyzing the frequency spectrum" on page 69.

System Regions – Defining and managing system regions

Defining system regions is useful in the following circumstances:

- You want to operate certain devices or device groups in defined frequency ranges.
- Certain devices are used spatially separated, e.g. on different stages or in different studios.
- Certain devices are used temporally separated.
- Microphone and monitoring systems are to be set and managed separately

You can use the system regions feature to separately set and manage microphone and monitoring systems. This adds a clear visual distinction for a better overview of the systems that are separated according to frequencies. Intermodulation products are calculated as usual.

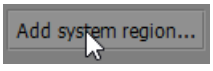
If certain devices are used spatially separated, they may not be able to influence each other through intermodulation products under certain conditions.

If devices are used temporally separated, intermodulation cannot occur.

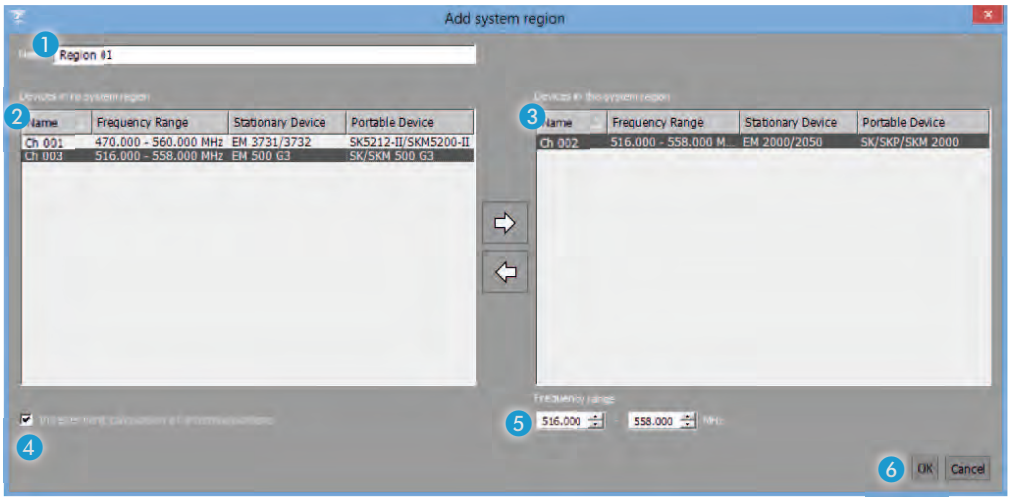
In both cases, you should define system regions and inform WSM that there is no risk of intermodulation products. In the "Coordination" tab, usable frequencies are then calculated without taking intermodulation products into account, giving you the maximum spacing between the coordinated frequencies.

Defining system regions

▶ Make sure that the "Devices" tab contains device data.



▶ In the "System regions" tab, click on "Add system region..." or right-click on the blank space of the "System regions" tab and select "Add system region" from the shortcut menu.
The "Add system region" window opens:



- ▶ Enter a name for the system region in the "Name" field (1). The default name "Region 01" is displayed in the "Name" field; as system regions are added, they are numbered in consecutive order.
- ▶ From the "Devices in no system region" box (2), select a device or a transmission link and then click on the white right-pointing arrow. The device/transmission link is moved to the "Devices in this system region" box (3).
- ▶ Repeat these steps for the other devices/transmission links.

If you can ensure that the devices are used spatially or temporally separated:

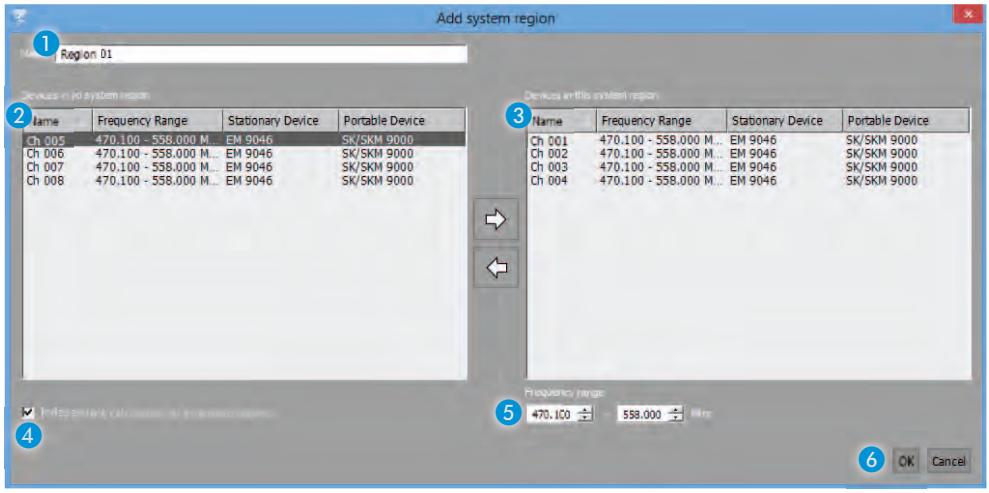
- ▶ Activate the "Independent calculation of intermodulations" check box.

If you have defined system regions in order to achieve a frequency range separation of systems but you cannot rule out the possibility of interference with other devices:

- ▶ Make sure that the "Independent calculation of intermodulations" check box is not activated.
- ▶ Exit the window by clicking on "OK" (6).

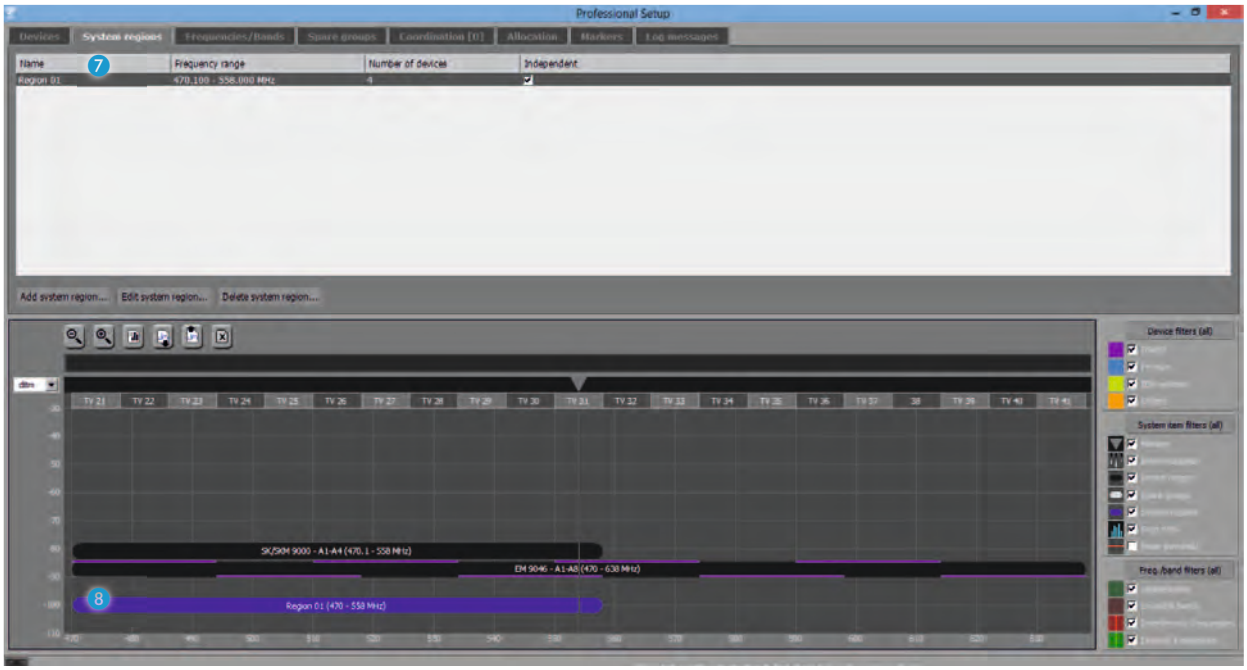
Example

You define a system region with the name "Stage 1" and move the first 4 transmission links to the "Devices in this system region" box:



After confirming the "Add system region" window by clicking on "OK", the system region 7 is displayed in the upper window area of the "System regions" tab.

If the "System regions" check box is activated, the frequency range used by the system region is displayed as a blue bar 8 in the graphical overview:



Editing system regions

To mark system regions as "independent" without opening the dialog window:

- Activate/deactivate the "Independent" check box.

To edit the names of system regions, to mark system regions as "independent" and to edit other parameters using the dialog window:

- In the upper window area, right-click on a system region and select "Edit system region" from the shortcut menu or select a system region and click on "Edit system region...".
- Edit the parameters of the system region.

Deleting system regions

- In the upper window area, right-click on one or several system regions and select "Delete system region" from the shortcut menu or select a system region and click on "Delete system region...".
- Confirm the safety query "Do you want to delete xx system region(s)?" by clicking on "OK".

Viewing/hiding system regions in the graphical overview

To view/hide all system regions:

- Activate/deactivate the "System regions" check box in the "System item filters (all)" area.

Changing the sorting of the system regions

▶ In the upper window area, click on one of the column headers "Name", "Frequency range", etc.
The system regions are sorted in an ascending order according to the entries in the column, an upward pointing triangle appears in the column header: .

To sort the system regions in a descending order:

▶ Click again on the column header.
A downward pointing triangle appears in the column header: .

Frequencies/bands – Setting prioritization levels for the frequency coordination and excluding frequencies from the frequency scan

The "Frequencies/Bands" tab allows you to mark frequencies and frequency bands as unusable or being interfered with so that they are excluded from the frequency coordination.

In addition, you can specify how frequencies and frequency bands are to be prioritized in the frequency coordination (Priority: "Low", "Medium", "High"). If, for example, you set the prioritization level for a license frequency to "High", this frequency will be highly prioritized in the frequency coordination.

Setting frequencies/frequency bands

▶ In the "Frequencies/Bands" tab, click on "Add freq./band..." or right-click on the blank space in the upper window area of the "Frequencies/Bands" tab to add the frequency or band.
The "Add frequency/band" window opens:

▶ Select a preset from the "Preset" list box.

or

- Select a frequency type from the "Type" list box 2. The corresponding option button in the "Priority" area 3 is automatically selected by default.

Frequency type	Priority default
Discrete frequency	"Medium"
Interference frequency	"Blocked"
Usable band	"Medium"
Unusable band	"Blocked"

- If necessary, adjust the prioritization level for the coordination of usable frequencies/bands in the "Priority" area 3.
- Adjust the noise level 3.
- If required, save your settings as a preset or delete existing presets in area 4.
- Exit the window by clicking on "OK".

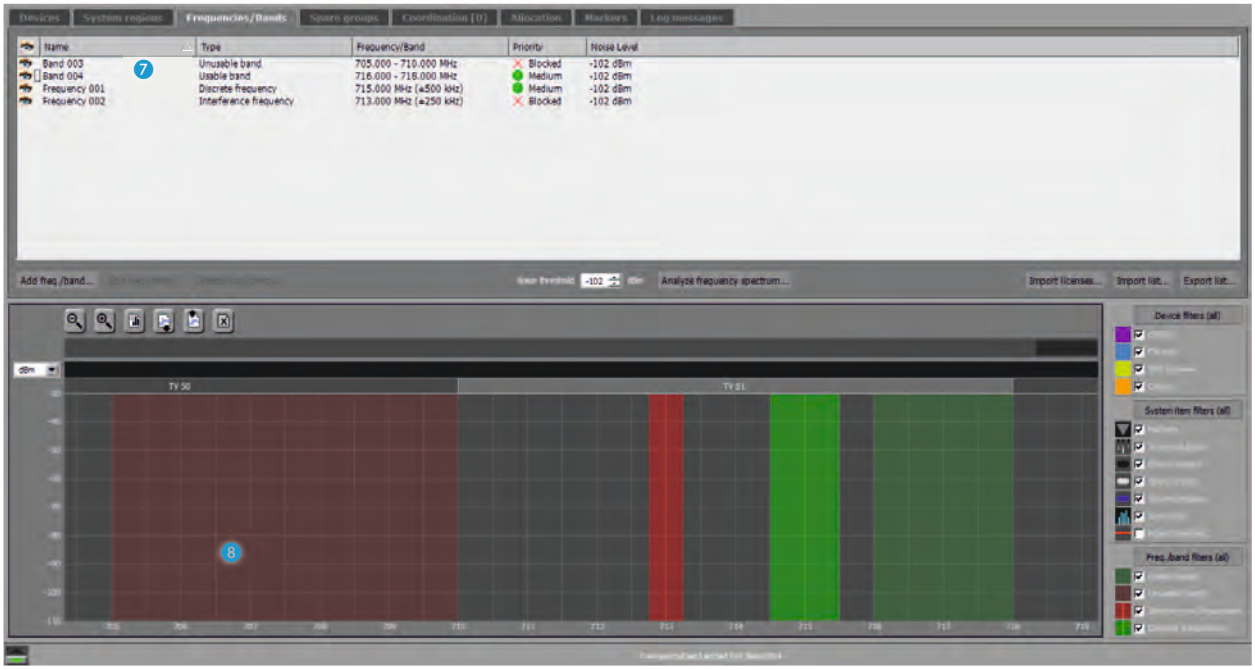
Example

You set an unusable frequency band named "TV Channels" for the 523.147 to 526.447 MHz frequency range:

After confirming the "Add frequency/band" window by clicking on "OK" 6, the unusable frequency band 7 is displayed in the upper window area of the "Frequencies/Bands" tab (see following page).

In the graphical overview, the unusable frequency band 8 is highlighted in transparent red:

Note that the tolerances of discrete frequencies and Interference frequencies are given in brackets (e.g. +/- 500 kHz).



Importing licensed frequencies

You can import licensed frequencies that are available as follows:

- Extension: .csv
- Frequency data is to be written as follows:
  - MHZ (z. B. 600; 600.0) or
  - MHz.kHz (e.g. 600.768; 600.7; 600.76) or
  - MHz,kHz (e.g. 600,768; 600,7; 600,76)
- Delimiters:
  - ; (#59) or
  - | (#124) or
  - : (#58) or
  - tab (#09) or
  - \CR (#0D)

To import licensed frequencies:

▶ Click on "Import licenses..." in the upper window area.

▶ Select the text file and then click on "OK".
The frequencies are imported as usable discrete frequencies with a high prioritization level in the frequency coordination.

Importing frequency lists

You can import frequencies/bands that are available as comma-separated value files:

- Extension: .csv
- Frequency data is to be written as follows:
  - MHZ (e.g. 600; 600.0) or
  - MHz.kHz (e.g. 600.768; 600.7; 600.76) or
  - MHz,kHz (e.g. 600,768; 600,7; 600,76)

- Delimiters:
  - ; (#59) or
  - | (#124) or
  - : (#58) or
  - Tab (#09) or
  - \CR (#0D)

To import frequency lists:

▶ Click on "Import list..." in the upper window area.

▶ Select the text file and then click on "OK".
The frequencies are added to existing or imported frequencies.

Exporting frequency lists

You can export existing frequencies/bands as comma-separated files.

- Extension: .csv
- The following data must be exported as semicolon-separated values:
  - name
  - type
  - frequency data in kHz (e.g. 600000 or 600768)
  - tolerance
  - lower frequency (in the case of discrete or interference frequencies, the lower frequency equals the discrete/interference frequency)
  - upper frequency (in the case of discrete or interference frequencies, the upper frequency equals the discrete/interference frequency)
  - priority
  - noise level

▶ Click on "Export list..." in the upper window area.

▶ Specify the storage location, select a name for the csv file and then click on "OK".

Analyzing the frequency spectrum

You can analyze the frequency spectrum or set and/or import frequencies/frequency bands. If the corresponding button is grayed out, you have not yet performed a frequency scan in the "Devices" tab.

▶ Charge the regional frequency grid of your country (see page 68).

▶ Make sure that you have performed a frequency scan in the "Devices" tab or that you have imported scanned frequencies (see page 51).

▶ Analyze the frequency spectrum by clicking on "Analyze frequency spectrum..." in the upper window area of the "Frequencies/Bands" tab.

You can reduce the interference frequencies for any scan data by increasing the noise threshold to the desired value. The noise threshold is indicated by a red line in the graphical overview. You can view/hide the noise threshold line in the graphical overview by activating/deactivating the "Noise threshold" check box in the "System item filters" area.

Scan data can also be viewed/hidden in the graphical overview by activating/deactivating the "Scan data" check box in the "System item filters" area.

Editing frequencies/bands

▶ From the upper window area, select a frequency/band and click on "Edit freq./band...".

▶ Edit the parameters of the frequency/frequency band.

Deleting frequencies/bands

▶ From the upper window area, select a frequency/band and click on "Delete freq./band...".

▶ Confirm the safety query "Do you want to delete xx frequency/band(s)?" by clicking on "OK".

Viewing/hiding frequencies/bands in the graphical overview

To view/hide individual frequencies/bands:

▶ Activate/deactivate the eye icon "" in the upper window area.

To view/hide usable, unusable or interfering frequencies/bands in groups:

▶ Activate/deactivate one or several check boxes in the "Freq./band filters (all)" area.

To view/hide all usable, unusable or interfering frequencies/bands:

▶ Activate/deactivate the "Freq./band filters (all)" button.

Changing the sorting of the frequencies/bands

▶ In the upper window area, click on one of the column headers "", "Name", "Type", etc.
The frequencies/bands are sorted in an ascending order according to the entries in the column, an upward pointing triangle appears in the column header: .

To sort the frequencies/bands in a descending order:

▶ Click again on the column header.
A downward pointing triangle appears in the column header: .

Spare Groups – Defining and managing spare frequency groups

The "Spare groups" tab allows you define groups of radio systems for which a specified number of shareable spare frequencies is to be calculated.

A spare frequency group can consist of different systems (e.g. Digital 9000 and 2000 series). One condition for this is, among other things, that the frequency ranges of the systems overlap.

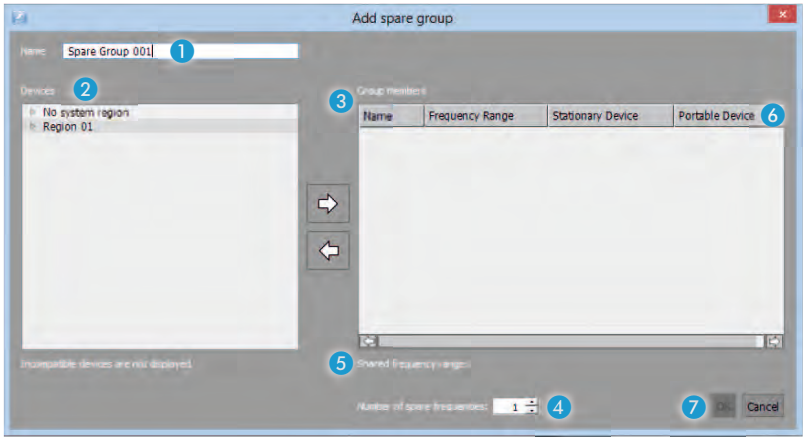
The WSM calculates the possible spare frequencies within the overlapping frequency range which are compatible with all systems of the spare frequency group.

If the operating frequency of a system is being interfered with, you can choose from a defined number of compatible frequencies that allow for flexible use.

Defining spare groups

▶ Make sure that the "Devices" tab contains device data.

▶ In the ''Spare groups'' tab, click on ''Add spare group...''.
The ''Add spare group'' window opens:



▶ Enter a name for the spare group in the ''Name'' field 1. The default name ''Spare Group 001'' is displayed in the ''Name'' field; as spare groups are added, they are numbered in consecutive order.

▶ From the ''Devices'' box 2, select a system region and then a transmission link and ...
- – click on the white right-pointing arrow to move the transmission link to the ''Group members'' box 3 or
- – with the left mouse button pressed, drag the transmission link into the ''Group members'' box 3.

▶ Repeat these steps for the other transmission links.

If you select a device from a system region in the ''Devices'' box 2 to add it to the ''Group members'' box 3, only devices having an overlapping frequency range with the selected device are listed in the ''Devices'' box 2 . All other devices are hidden.

▶ In the ''Number of spare frequencies'' field 4, enter the number of spare frequencies to be available in case of need. This number is displayed in the ''Spare frequencies'' column in the ''Devices'' tab.

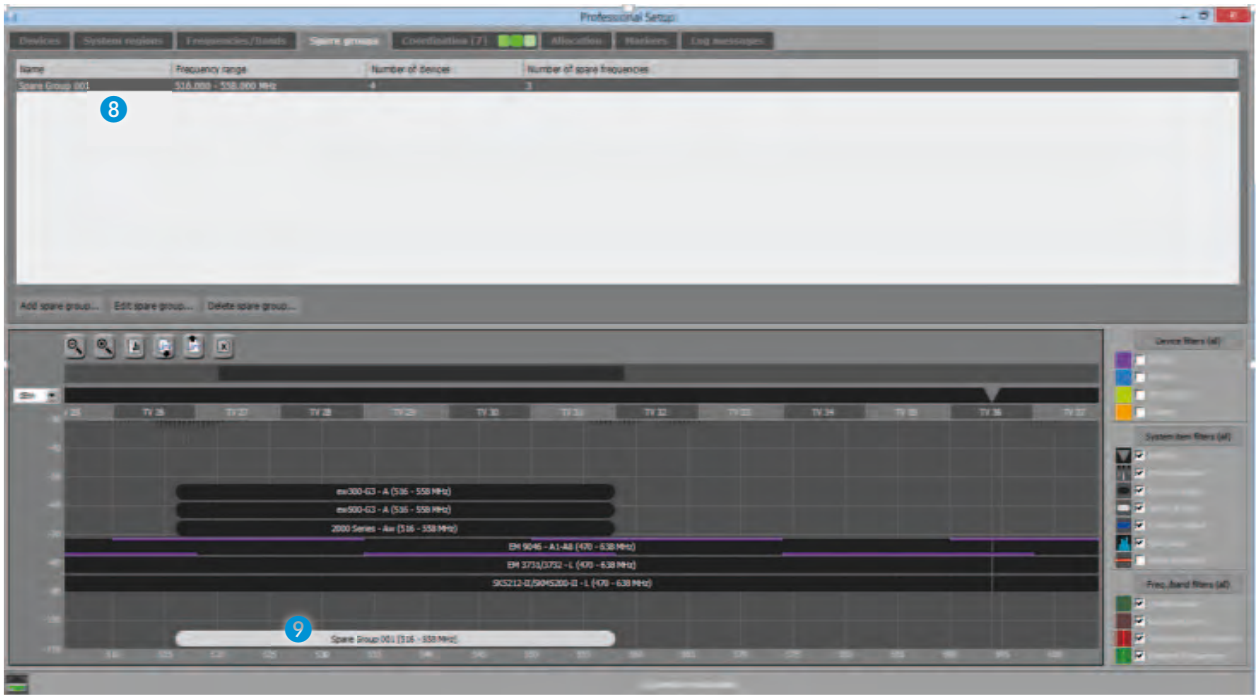
The overlapping/shared frequency range for the devices added in the spare group is shown behind ''Shared frequency range'' 5. This shared frequency range is considered for coordination.

The ''Portable device'' column 6 in the ''Group members'' box 3 lists the available portable device for each stationary device in the list.

▶ Exit the window by clicking on ''OK'' 7.

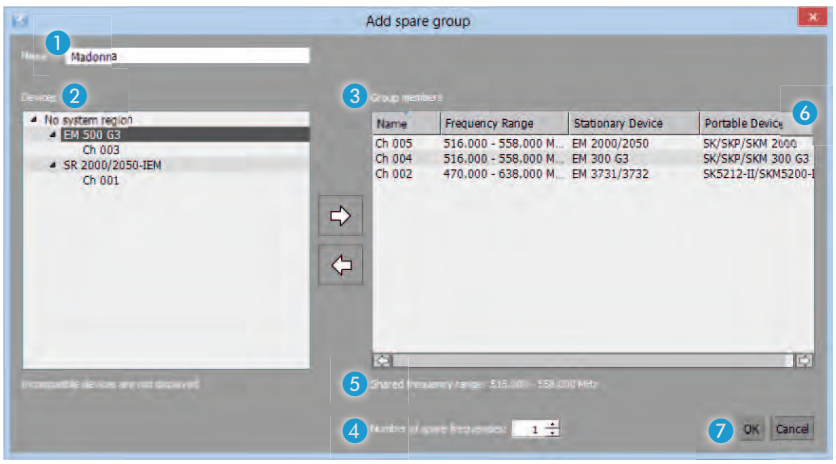
After confirming the ''Add spare group'' window by clicking on ''OK'', the spare group 8 is displayed in the upper window area of the ''Spare groups'' tab.

If the ''Spare groups'' check box is activated, the frequency range used by the spare group is displayed as a gray bar 9 in the graphical overview.



Example

You define a spare group with the name ''Madonna'' and move 3 transmission links to the ''Group members'' box:



The shared/overlapping frequency range of the devices is shown behind ''Shared frequency range'' 5. After confirming the ''Add spare group'' window by clicking on ''OK'' 7, the spare group is displayed in the upper window area of the ''Spare groups'' tab.

Editing spare groups

- From the upper window area, select a spare group and click on ''Edit spare group...''.
- Edit the parameters of the spare group.

You can edit any parameter (e.g. name, number of spare frequencies). You can also remove devices from the "Group members" box (3) by selecting the device and clicking on the left-pointing white arrow.

Deleting spare groups

- From the upper window area, select a spare group and click on "Delete spare group...".
- Confirm the safety query "Do you want to delete xx spare group(s)?" by clicking on "OK".

Changing the sorting of the spare groups

- In the upper window area, click on one of the column headers "Name", "Frequency range", "Number of devices", etc.
  The spare groups are sorted in an ascending order according to the entries in the column, an upward pointing triangle appears in the column header: .

To sort the spare groups in a descending order:

- Click again on the column header.
  A downward pointing triangle appears in the column header: .

Coordination – Coordinating intermodulation-free frequencies

The "Coordination" tab allows the calculation and coordination of intermodulation-free frequencies that are suitable for the prespecified frequency conditions.

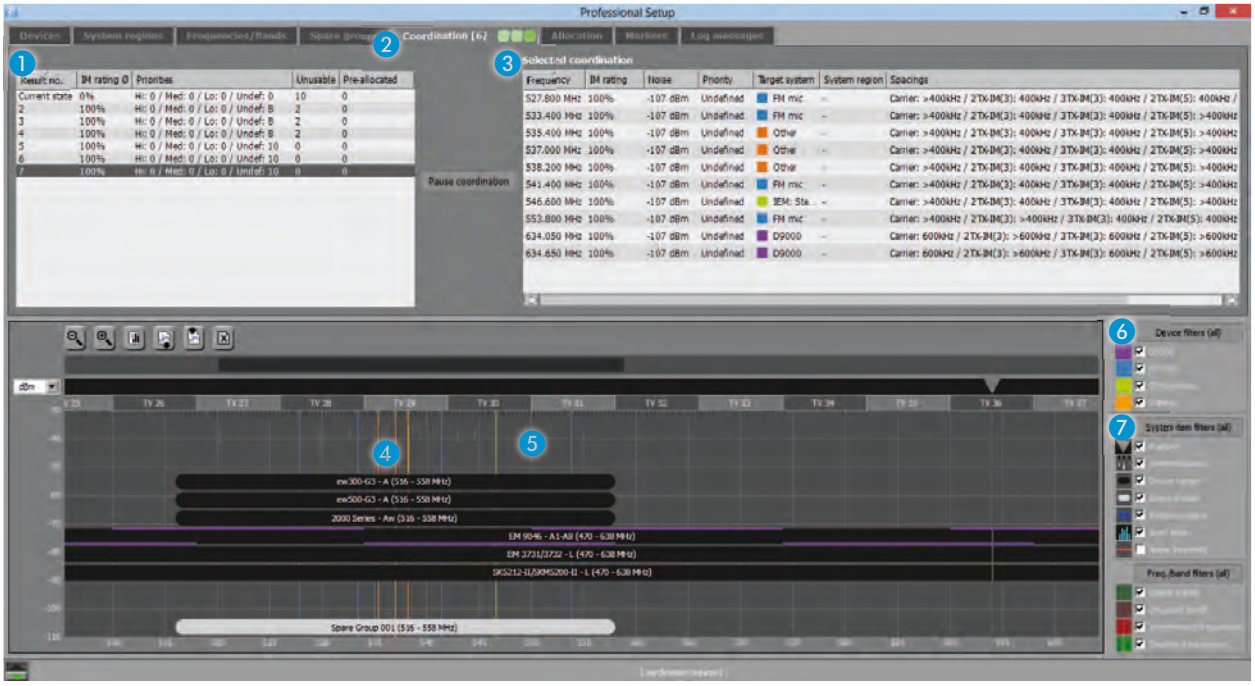
The coordination depends on the following parameters:

- Devices set in the "Devices" tab
- Settings made in the "System regions", "Frequencies/Bands" and "Spare groups" tabs

Starting the coordination

- Make sure that the "Devices" tab contains device data (either self-entered or automatically read in).
- Check if all the desired settings have been made in the "System regions", "Frequencies/Bands" and "Spare groups" tabs.

- In the upper window area of the "Coordination" tab, click on "Start coordination".
  The coordination of intermodulation-free frequencies starts.
  - The coordination results are displayed on the left hand side (1) of the upper window area and are continuously updated.
  - The header (2) of the "Coordination" tab displays the number of coordination results. This information remains visible even when you change to another tab.
  - If you select a coordination result, the coordinated frequencies are displayed in the "Selected coordination" box (3) on the right hand side of the upper window area and are also shown as solid, colored lines (4) in the graphical overview.
  - In addition, the calculated intermodulation products (5) are displayed.



Changing the sorting of the frequencies

▶ In the "Selected coordination" box 3 on the right hand side of the upper window area, click on one of the column headers ("Frequency", "IM Rating", "Priority", etc.).
The frequencies are sorted in an ascending order according to the entries in the column and an upward pointing triangle appears in the column header: .

To sort the frequencies in a descending order:

▶ Click again on the column header.
A downward pointing triangle appears in the column header: .

Viewing/hiding frequencies in the graphical overview

To view/hide individual frequency groups:

▶ Activate/deactivate the corresponding check boxes ("D9000", "FM mics", "IEM systems" or "Others") in the "Device filters" area 6.

To view/hide all frequencies:

▶ Activate/deactivate the "Device filters (all)" button.

Viewing/hiding intermodulation products in the graphical overview

To view/hide intermodulation products:

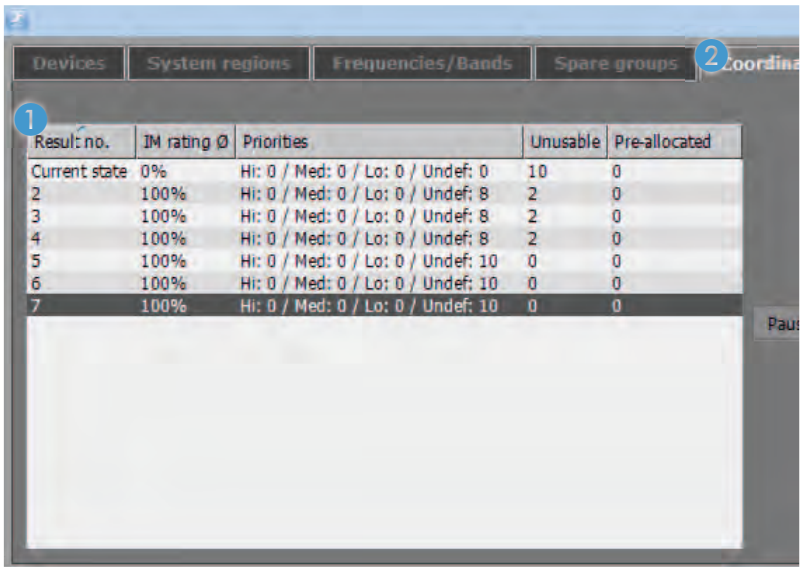
▶ Activate/deactivate the "Intermodulation" check box in the "System item filters" area 7.

Allocation – Allocating frequencies to channels and editing allocations

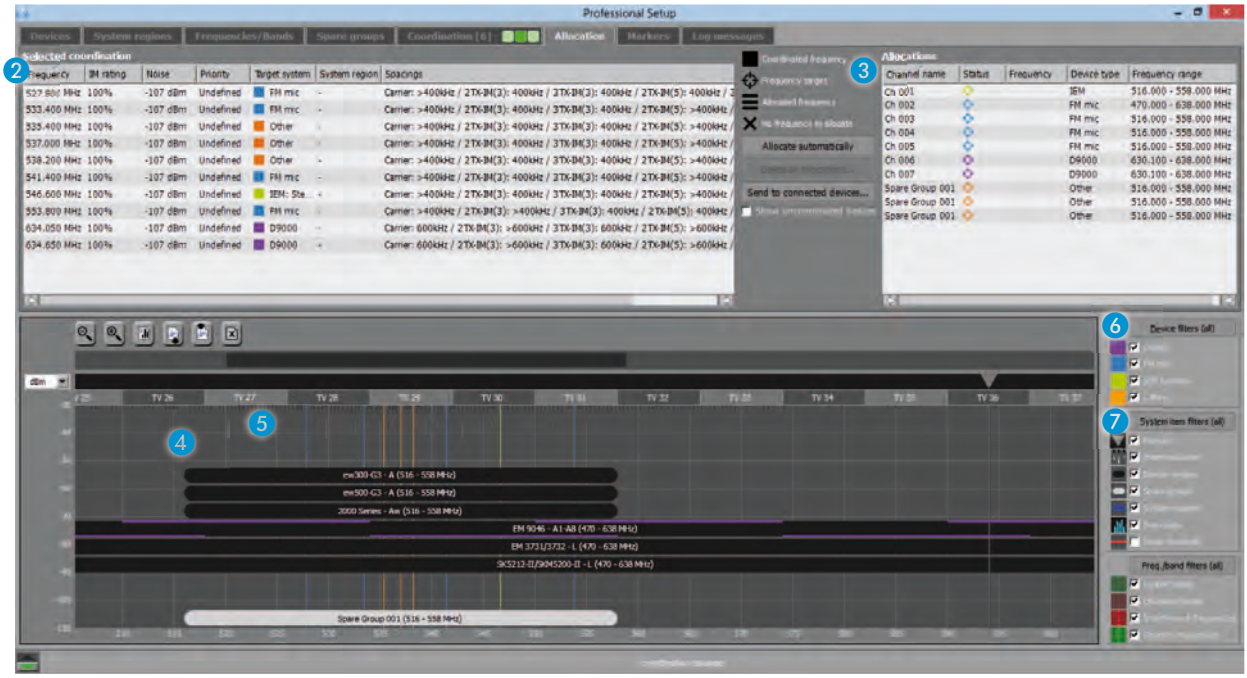
The ''Allocation'' tab allows you allocate frequencies to channels, either by drag and drop or automatically, and to edit the allocations.

Selecting a coordination result for the allocation

- Make sure that you have calculated intermodulation-free frequencies in the ''Coordination'' tab.
- From the ''Coordination'' tab, select a coordination result for the allocation:



- Change to the ''Allocation'' tab.
  The frequencies are displayed in the ''Selected coordination'' box 2 on the left hand side and the channels are displayed in the ''Allocations'' box 3 on the right hand side of the upper window area:



Filtering the displayed allocations in the "Allocation" box

▶ Select a device in the "Selected coordination" box to filter the allocations in the "Allocations" box so that only the allocations possible for the selected device are displayed.

Allocating frequencies

▶ Using drag and drop, drag the frequencies from the "Selected coordination" box ❷ and drop them on channels in the "Allocations" box ❸.

or

▶ Automatically allocate frequencies to channels by clicking on "Allocate automatically".

Allocated frequencies appear as dotted lines in the graphical overview.

Deleting allocations

To delete individual allocations:

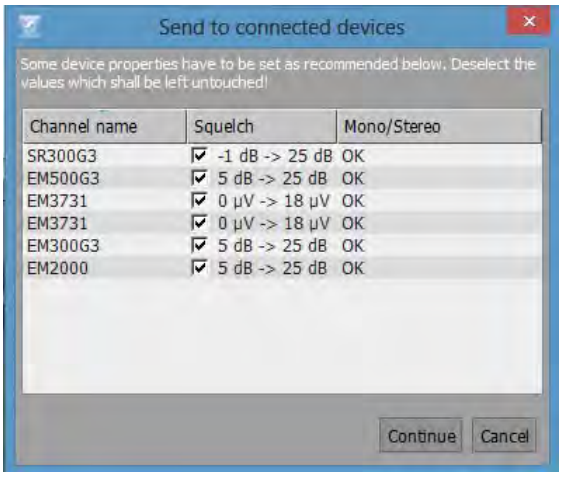
▶ Click on the allocations and drag them from the "Allocations" box ❸.

To delete all allocations:

▶ Click on "Delete all allocations..." in the upper window area of the "Allocation" tab.

Sending allocations to connected devices

▶ Click on "Send to connected devices..." in the upper window area of the "Allocation" tab.
If the squelch level of online devices is less than the noise level of the frequencies allocated to the devices, the following window opens, showing the recommended squelch levels for the listed devices.



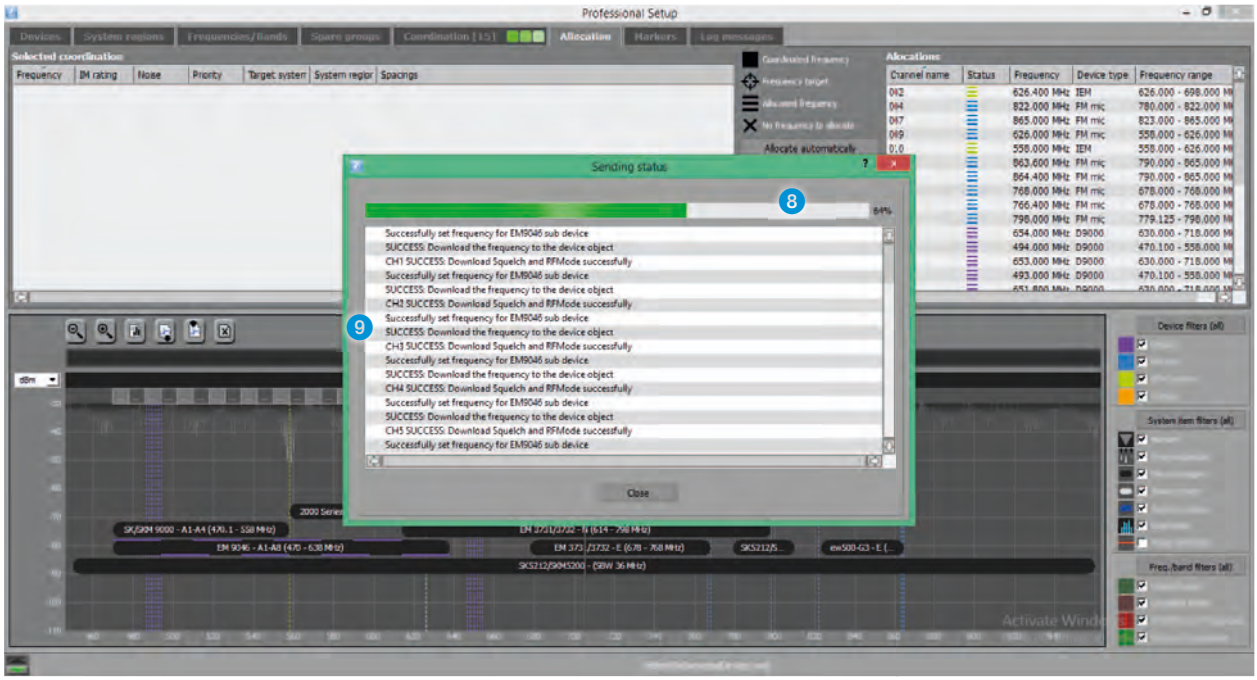
The recommended squelch levels are sent to the corresponding devices together with the allocated frequencies.

If you want to continue using the previously set squelch levels:

▶ In the "Squelch" column, deactivate the check boxes for the corresponding devices and click on "Continue".

Before you can change parameters such as the squelch level, you must activate the "Remote Access" menu item in the "System" menu.

When you click on "Continue", the "Sending status" window opens.



The "Sending status" window shows a progress bar 8, indicating the progress of frequency allocation to the connected devices in percent. The list of messages 9 displays progress information in text form.

Changing the sorting of the frequencies and/or channels

- In the "Selected coordination" box 2 and the "Allocations" box 3 of the upper window area, click on one of the column headers.
  The frequencies/channels are sorted in an ascending order according to the entries in the column, an upward pointing triangle appears in the column header: .

To sort the frequencies/channels in a descending order:

- Click again on the column header.
  A downward pointing triangle appears in the column header: .

Viewing/hiding frequencies in the graphical overview

To view/hide individual frequency groups:

- Activate/deactivate the corresponding check boxes ("D9000", "FM mics", "IEM systems" or "Others") in the "Device filters" area 6.

To view/hide all frequencies:

- Activate/deactivate the "Device filters (all)" button.

Viewing/hiding intermodulation products in the graphical overview

To view/hide intermodulation products:

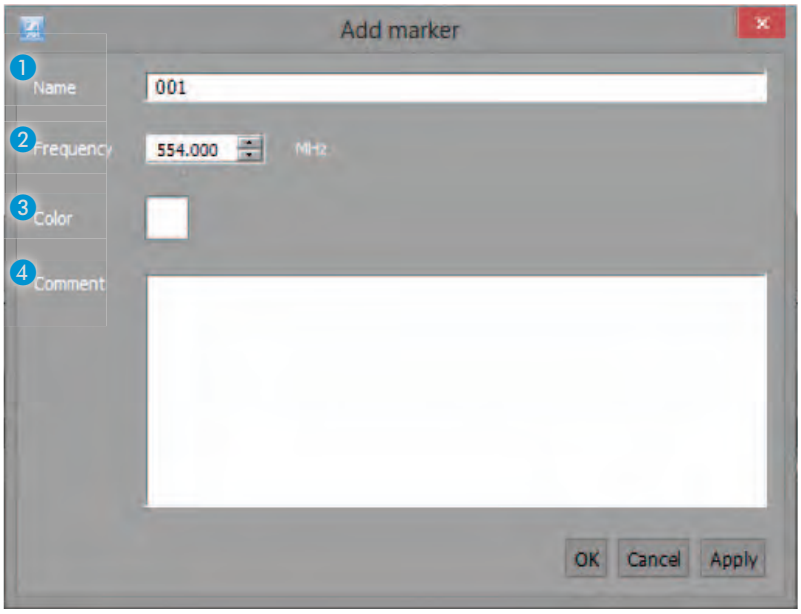
- Activate/deactivate the "Intermodulation" check box in the "System item filters" area 7.

Markers – Setting and editing markers

The "Markers" tab allows you to set colored markers and label them with names in order to mark certain positions in the frequency spectrum.

Setting markers

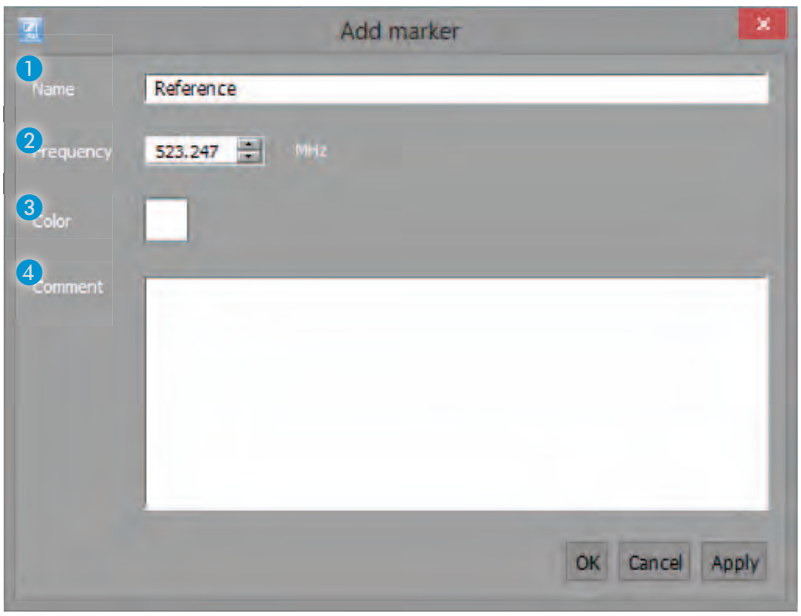
▶ Click on "Add marker...".
The "Add marker" window opens:



▶ Enter a name and select a frequency and a color.
▶ Enter a comment if necessary.
▶ Exit the window by clicking on "OK".

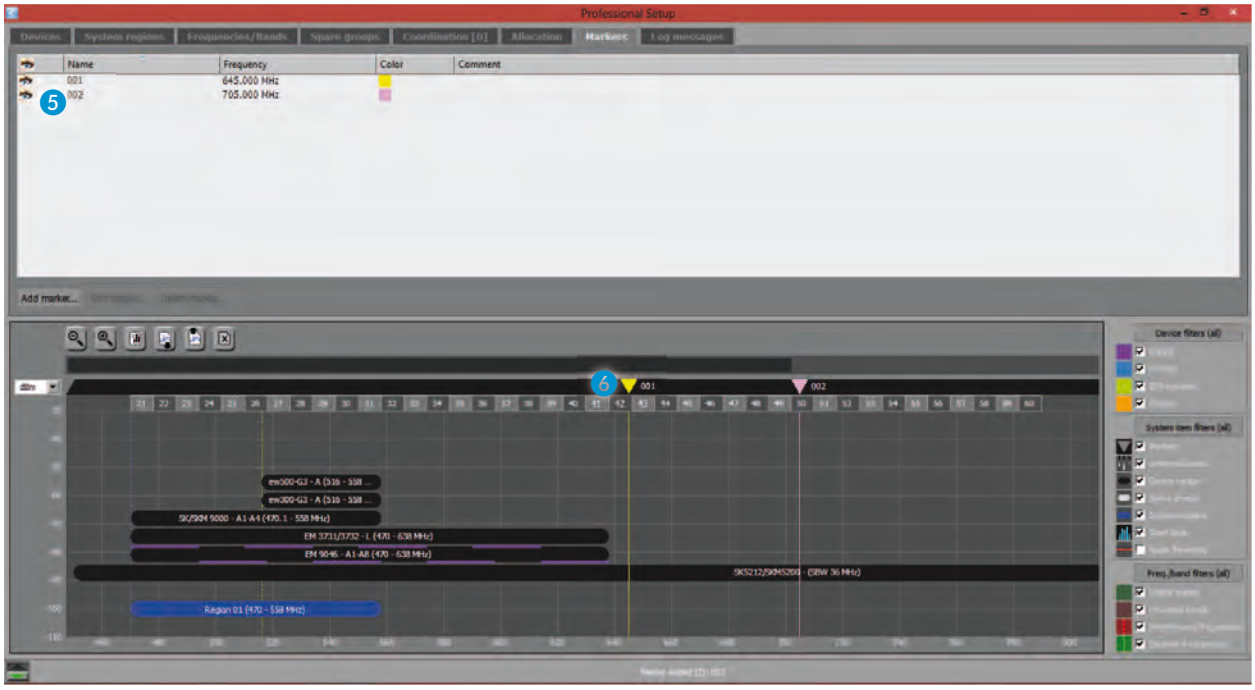
Example

You set a white marker with the name "Reference" for the frequency of 523.247 MHz:



After confirming the ''Add marker'' window by clicking on ''OK'', the marker 5 is displayed in the upper window area of the ''Markers'' tab.

In the graphical overview, the marker appears as a vertical line 6. The upper end of the marker shows a downward pointing triangle and the label of the marker:



Editing markers

- From the upper window area, select a marker and click on ''Edit marker...''
- Edit the parameters of the marker.

Deleting markers

- From the upper window area, select a spare group and click on ''Delete marker...''.
- Confirm the safety query ''Do you want to delete xx marker(s)?'' by clicking on ''OK''.

Viewing/hiding markers in the graphical overview

To view/hide individual markers:

- Activate/deactivate the eye icon '' '' in the upper window area.

To view/hide all markers:

- Activate/deactivate the ''Markers'' check box in the ''System item filters'' area.

Changing the sorting of the markers

- In the upper window area, click on one of the column headers '' '', ''Name'', ''Frequency'' etc.
  The markers are sorted in an ascending order according to the entries in the column, an upward pointing triangle appears in the column header: .

To sort the markers in a descending order:

▶ Click again on the column header.
A downward pointing triangle appears in the column header: .

Loading the regional frequency grid, performing a frequency scan and analyzing the frequency spectrum

After having made all relevant settings in the tabs of the "Professional Setup" window, you can now perform the following steps.

Information on the regional frequency grid

The regional frequency grid provides information on which frequencies in your country are reserved for primary use (TV broadcasters, mobile phone operators, etc.). The frequencies' availability for secondary use by your radio systems can be determined manually using the regional grid or by means of an automatic spectrum analysis. Always make sure to comply with the regulatory and legal requirements for secondary use. Check if a more appropriate or up-to-date regional grid definition is available for your venue, e.g. as a download from the Sennheiser website at www.sennheiser.com.

▶ Analyze the frequency spectrum at your venue (see page 69).

▶ Read and follow the regulatory and legal requirements for secondary use by your radio systems.

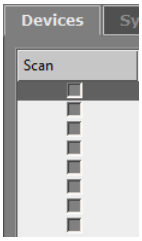
Loading the regional grid bar of your country

▶ Right-click on the active regional grid bar.

▶ Click on "Change regional grid...".

▶ Select the desired file and then click on "Open".

Performing or importing a frequency scan



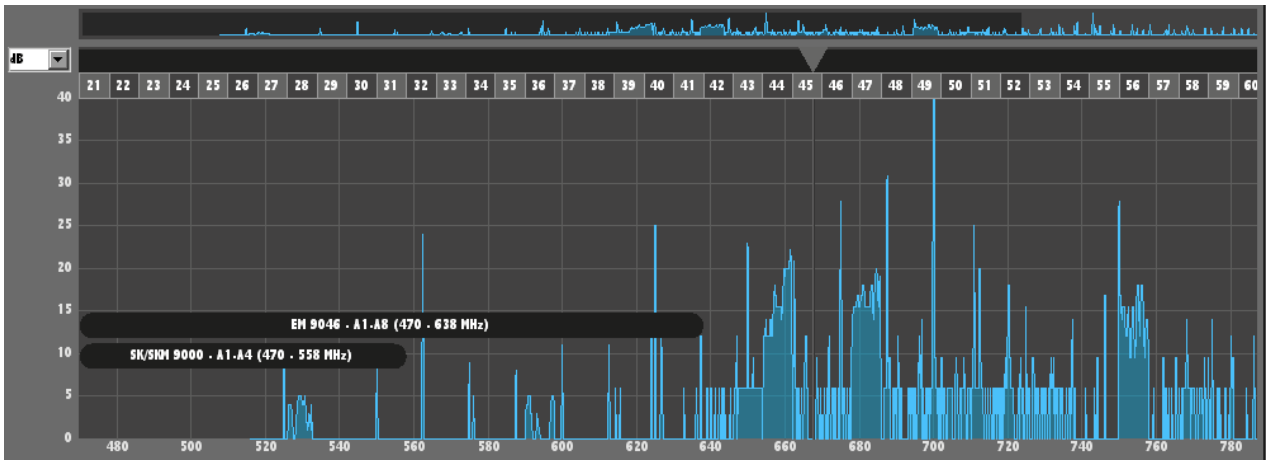
To perform a frequency scan at the venue of the planned event:

▶ In the "Devices" tab, activate the desired devices in the "Scan" column of the device list.

▶ Click on "Start frequency scan" in the buttons area 4.

To import a frequency scan:

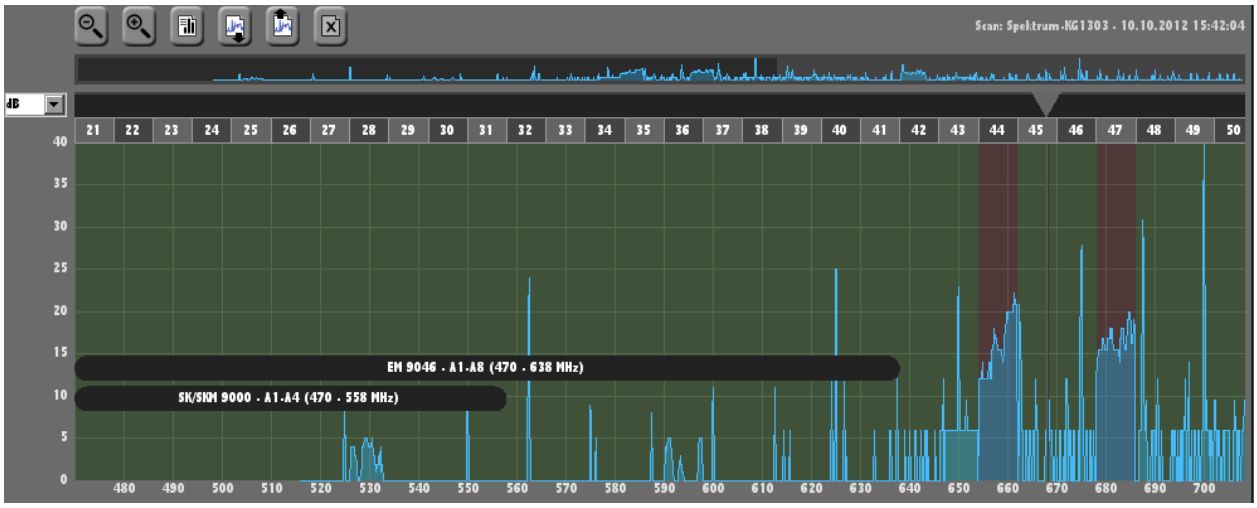
▶ Click on the "Import frequency" button in the graphical overview.
After the frequency scan has been performed/imported, the scan result appears transparent light blue in the graphical overview:



Analyzing the frequency spectrum

▶ Change to the "Frequencies/Bands" tab and click on "Analyze frequency spectrum...".
The analysis result appears in list form in the upper frequency window and is also displayed graphically in the graphical overview.

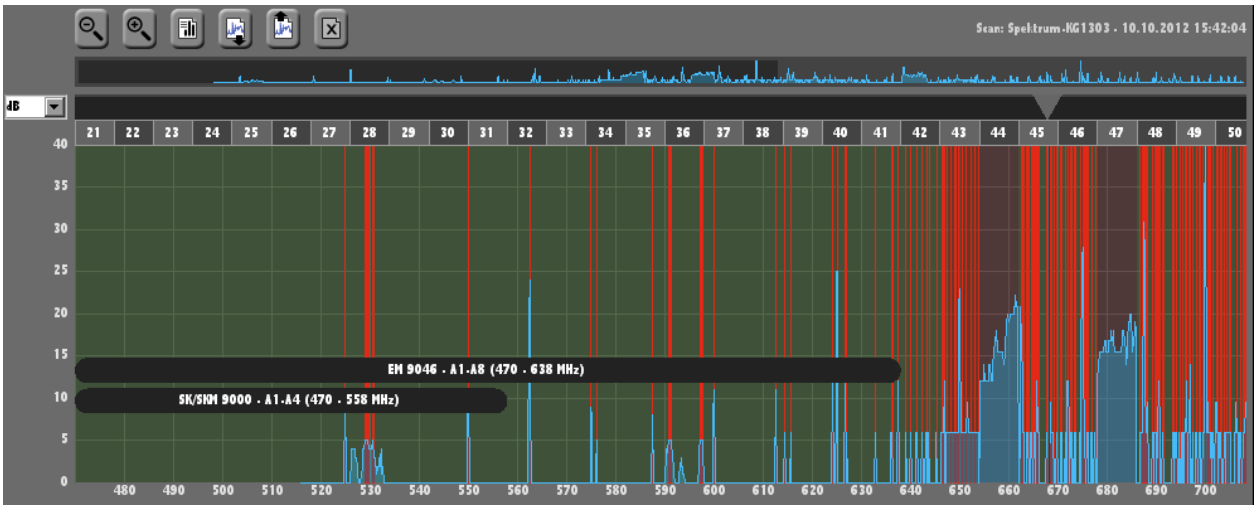
Name	Typ	Frequenz/Bereich	Priorität	Störpegel
FM Tx - 01	Störfrequenz	525,037 MHz	Nicht nutzbar	5 dB
FM Tx - 02	Störfrequenz	529,137 MHz	Nicht nutzbar	5 dB
FM Tx - 03	Störfrequenz	529,325 MHz	Nicht nutzbar	5 dB
FM Tx - 04	Störfrequenz	529,450 MHz	Nicht nutzbar	5 dB
FM Tx - 05	Störfrequenz	529,575 MHz	Nicht nutzbar	5 dB
FM Tx - 06	Störfrequenz	529,700 MHz	Nicht nutzbar	5 dB
FM Tx - 07	Störfrequenz	530,625 MHz	Nicht nutzbar	5 dB
FM Tx - 08	Störfrequenz	530,800 MHz	Nicht nutzbar	5 dB
FM Tx - 09	Störfrequenz	550,037 MHz	Nicht nutzbar	5 dB
FM Tx - 10	Störfrequenz	562,537 MHz	Nicht nutzbar	5 dB



Usable frequency ranges are displayed in transparent green (can be viewed/hidden via the "Usable bands" check box in the "Freq./band filters" area.

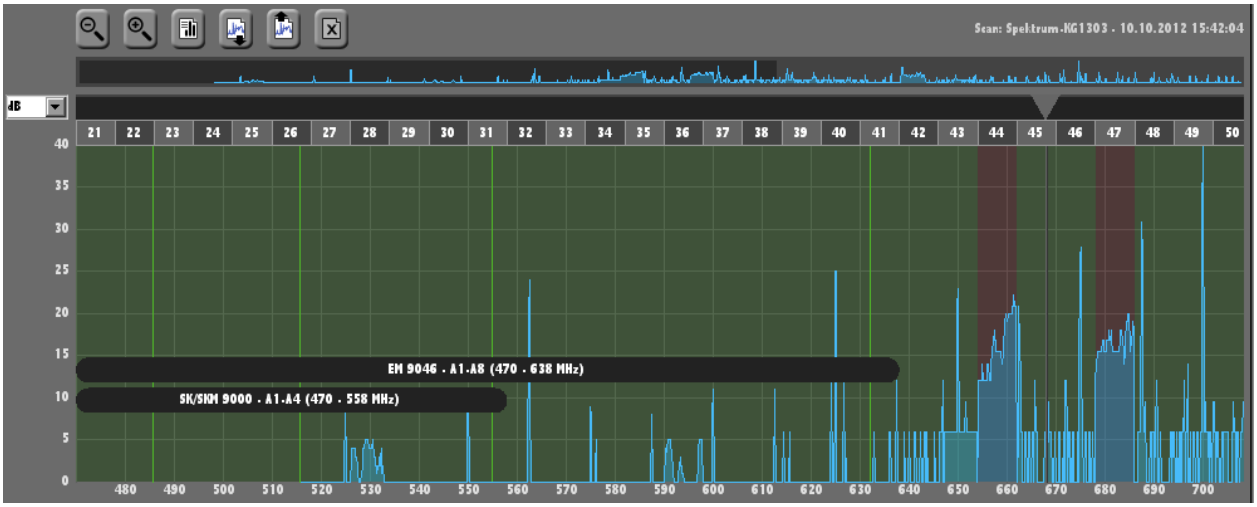
Unusable frequency ranges are displayed in transparent red (can be viewed/hidden via the "Unusable bands" check box in the "Freq./band filters" area).

Interference frequencies appear as vertical orange lines (can be viewed/hidden via the "Interference frequencies" check box in the "Freq./band filters" area):



Interference frequencies are not taken into account in the intermodulation calculation and are ignored when new frequencies are placed.

Discrete frequencies appear as vertical green lines (can be viewed/hidden via the "Discrete frequencies" check box in the "Freq./band filters" area):



These frequencies can be prioritized in the calculation over overlapping usable frequencies or undefined frequencies by assigning them a higher priority.

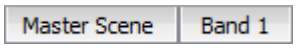
- ▶ Evaluate the result of the spectrum analysis:
  - – Are there any interference frequencies or frequency bands that are marked as occupied but you know for sure that they can be used?
  - – Are there any frequencies/frequency bands that are marked as usable but you know for sure that they cannot be used?
  - – Do the settings in the "Priority" column still apply to your current transmission situation?
- ▶ Adjust the result of the frequency spectrum analysis:
  - – From the upper frequency range, select the entries and click on "Edit freq./bands...".
  - – Modify the desired settings.

Coordinating and allocating frequencies

You can coordinate frequencies and allocate these frequencies to channels as described in the chapters ‘‘Coordination – Coordinating intermodulation-free frequencies’’ on page 61 and ‘‘Allocation – Allocating frequencies to channels and editing allocations’’ on page 63.

Working with scenes

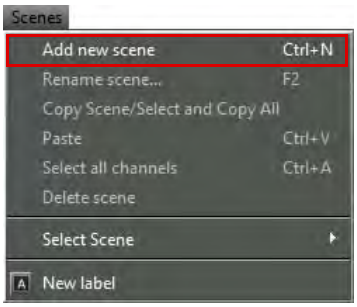
The WSM allows you to define views, the so-called "scenes". In each scene, you can set up and move panels (see "Working with panels" on page 76). Thus, the scenes only display the transmission links relevant to you.



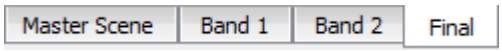
When you create a new configuration, there is first only the "Master Scene".
The "Master Scene" has the following particularities in comparison with other scenes:

- As soon as a new device is detected, it automatically appears as a panel in the "Master Scene". All other scenes are not affected.
  The "Master Scene" is an overview help. Therefore, do not use the "Master Scene" for configurations that you want to use repeatedly.
- You cannot delete or rename the "Master Scene".

Adding new scenes



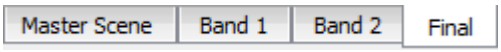
▶ Click on "Scenes" > "Add New Scene".
The new scene is added. A new tab with the name "Scene 1" appears.



The display area of the scene is empty at first.

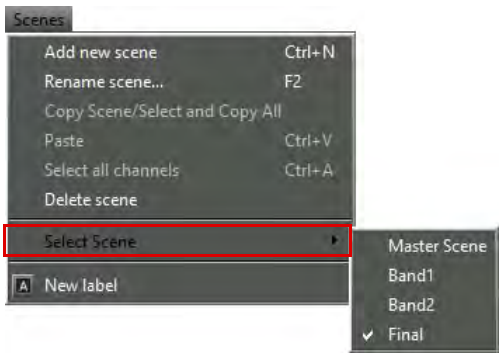
You can now drag panels in the new scene (see page 76) or use the scene for one of the tools (see page 92).

Selecting a scene



▶ Click on the tab of the desired scene.
The scene appears in the display area.

Or:



▶ Click on "Scenes" > "Select Scene".
The submenu containing the names of the scenes appears.

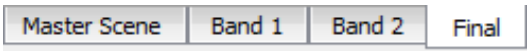
▶ Click on the desired scene.
The scene appears in the display area.

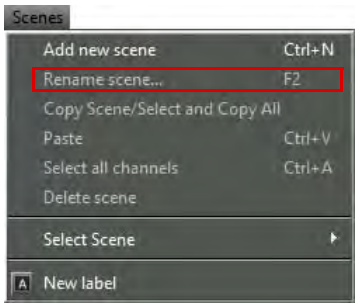
Renaming a scene

You cannot rename the "Master Scene".

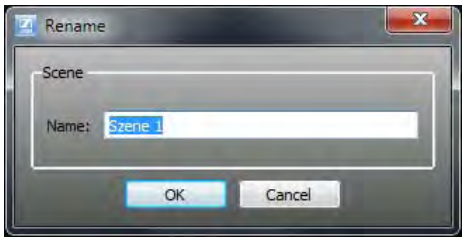
To rename other scenes:

▶ Click on the tab of the scene you want to rename.





▶ Click on "Scenes" > "Rename Scene..." or press the "F2" key.
The "Rename" window appears.



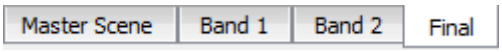
▶ Enter a new name for the scene.

▶ Click on "OK".
The entered name appears on the tab.

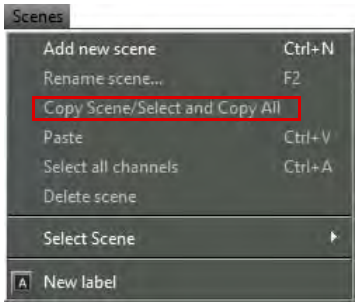
Copying and pasting scenes

You can copy the contents (panels or tools) of a scene and paste them into a new scene.

To copy the contents of a scene and paste them into another:



▶ Click on the tab of the scene you want to copy.



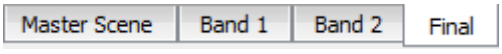
▶ Click on "Scenes" > "Copy Scene".

▶ Click on "Scenes" > "Paste Scene".
The contents of the copied scene are pasted.

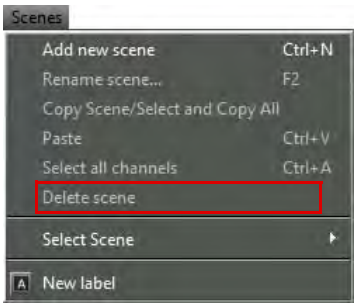
Deleting a scene

When deleting a scene, the configuration of the devices is retained.

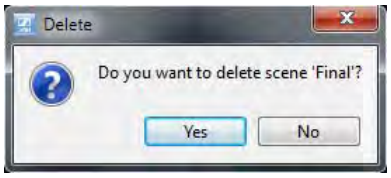
You cannot delete the "Master Scene".



▶ Click on the tab of the scene you want to delete.



- Click on "Scenes" > "Delete Scene".
  The "Delete" window appears.

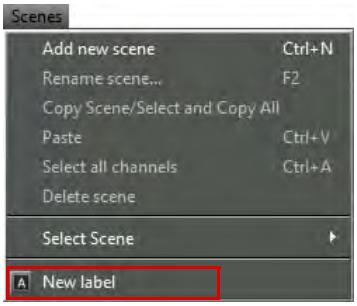


- Click on "Yes".
  The scene is deleted.

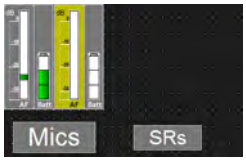
Scene commentary (label)

You can paste labels into a scene to provide a better overview. The labels can be freely dragged and re-sized.

Pasting labels



- In the "Scenes" menu, click on > "New Label".
  A label appears in the scene. The cursor blinks in the middle of the label.
- Enter your commentary.
  The font size is automatically adjusted to the size of the label.



To change the text at a later time:

- Right-click on the label.
  A submenu appears.
- Click on "Edit".
  The cursor appears in the text.
- Change the text in the label.

Dragging labels

- Click on the label.
  The move symbol appears.
- Move the label to the desired position.

Re-sizing labels

- Click on the edge of the label.
  Selection points appear at the edge of the label.
- Drag on one of the selection points to change the size of the label. Dragging one of the corner selection points changes both the height and width of the label.

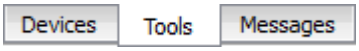
Deleting labels

- ▶ Right-click on the label.
  A submenu appears.
- ▶ Click "Delete".
  The cursor appears in the text.
- ▶ Change the text in the label.
  The label is deleted.

Working with panels

The WSM enables you to keep a clear overview of even large systems (see page 13). The scalable panels display the most important parameters of your transmission links.

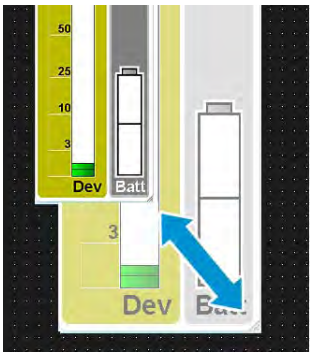
Creating panels



To create a new panel:

- In the system window, click on the "Devices" tab.
- Click on a device and keep the mouse button pressed.
- Drag the device in the scene.
  A new panel appears in the scene.
  In the system window, an eye appears next to the device. The eye indicates that the corresponding device is displayed in the currently selected scene as a panel.

Enlarging/reducing panels



There is a dashed area in the lower right corner of the panel.

To steplessly reduce or enlarge the panels:

- Click on the dashed area.
- Keep the mouse button pressed and drag the panel to the left (= reduce) or to the right (= enlarge).

When you considerably zoom out a panel, the scales are hidden to provide a better overview.

Selecting several panels

When you select several panels, you can move, copy and cut them simultaneously, you can display the common parameters of the channels and you can edit these channel parameters (see page 84).

To select several panels:

- Click on a panel and keep the "Ctrl"/"Cmd" key pressed.
- Click on further panels in order to select them.
  The selected panels are highlighted in color.

or

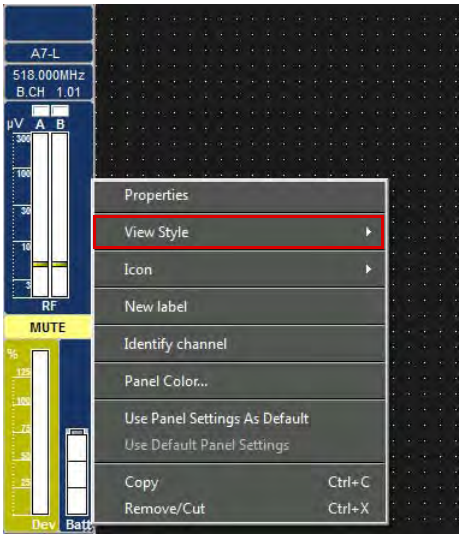
- Click on the background while keeping the left mouse button pressed.
- With the mouse pointer, draw a rectangle over the desired panels.
  The selected panels are highlighted in color.

Changing the graphical representation of panels

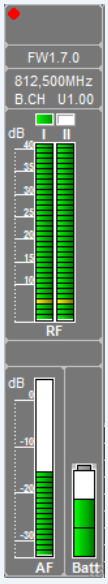
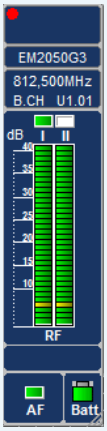
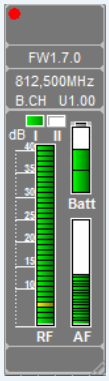
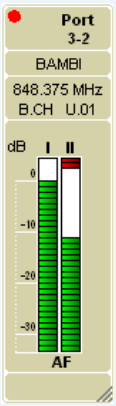
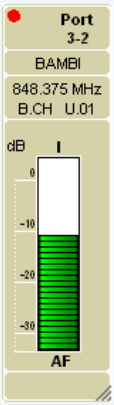
The WSM allows you to choose between different settings and graphical representations for the panels.

Changing the graphical representation of a panel

To change the graphical representation for a panel:



- Right-click on the panel.
  A shortcut menu appears.
- Click on "View Style".
  The submenu containing different panel styles appears.
- Select a panel style:

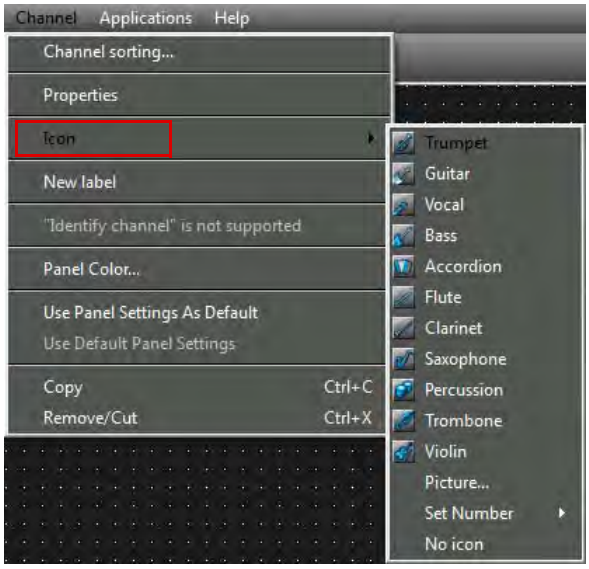
Panel styles for receivers			Panel styles for transmitters	
Variant 1	Variant 2	Variant 3	Mode: Stereo	Mode: Mono
				

- The panel style for a "transmitter" panel depends on the device settings.
- When you considerably zoom out a panel, the scales are hidden to provide a better overview.

Selecting an icon for a panel

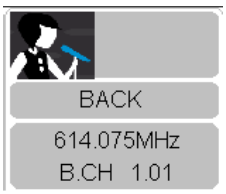
To provide for a better overview, you can assign an icon corresponding to the instrument or a number to each panel. Alternatively, you can assign pictures – e.g. photos of the performers.

To select an icon for a panel:



- ▶ Click on the desired panel.
- ▶ Click on "Channel" > "Icon".
  A submenu appears.
- ▶ Select one of the icons.
  The icon appears in the upper left corner of the selected panel.
  or:
- ▶ Click on "Set Number" and select a number between 1 and 50.
  The number appears in the upper left corner of the selected panel.

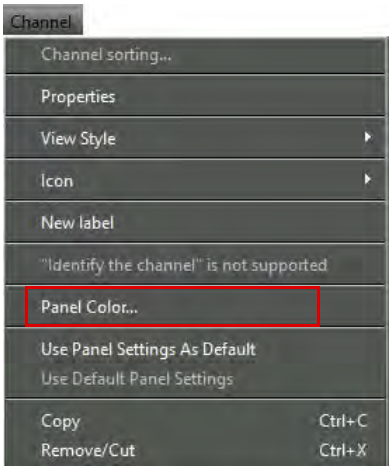
  or:
- ▶ Click on "Icon".
  The "Open" window of your operating system appears.
- ▶ Select a graphic or a picture.
- ▶ Click on "Open".
  The picture appears in the upper left corner of the selected panel.



Changing the color of a panel

To assign a color to the border of the panel:

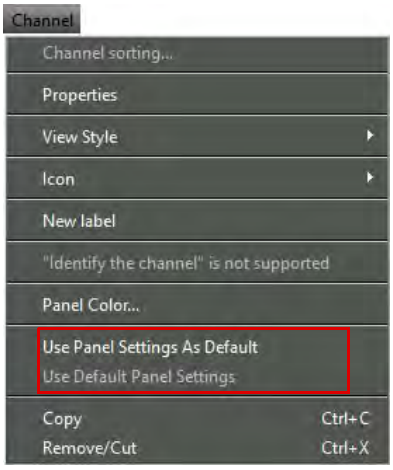
- Click on the desired panel.
- Click on "Channel" > "Panel Color".
  The "Panel Color" window appears.
- Select a color and click on "OK".
  The window closes. The border color of the panel is changed.



Defining standard panel settings and applying them

To define standard panel settings:

- Set up a panel as desired.
- Click on the panel.



- Click on "Channel" > "Use Panel Settings As Default".
  The settings such as panel style, size, icon and color of the selected panel are saved.

To apply the last saved standard panel settings to the panels:

- Select one or several panels.
- Click on "Channel" > "Use Default Panel Settings".
  The settings such as panel style, size, icon and color are applied to the selected panels.

Aligning and moving panels

Moving panels

- Click on a panel or select several panels.
- Keep the left mouse button pressed and drag the panel(s) to the desired position.

Aligning panels to the grid

- Click on "View" > "Show Grid" to show the grid.
  The grid is shown.
- Click on the panel and keep the mouse button pressed.
- Drag the panel to the desired position in the scene.
  If the "Snap to grid" menu item is activated, the panel is automatically aligned to the grid.

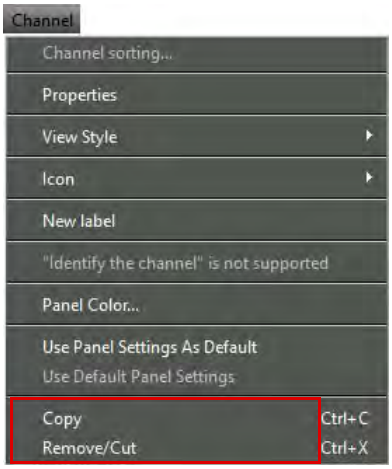
Arranging panels automatically

- Click on "View" > "Auto Arrange".
  A tick appears in front of the menu item. The panels are arranged side by side.

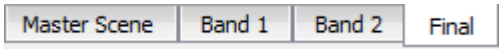
Adding a panel to a different scene

- Select one or several panels.

To copy or cut a panel:



- Click on "Channel" > "Copy" or "Remove/Cut".
- Click on the tab of the desired scene.
  The scene appears on the display area.

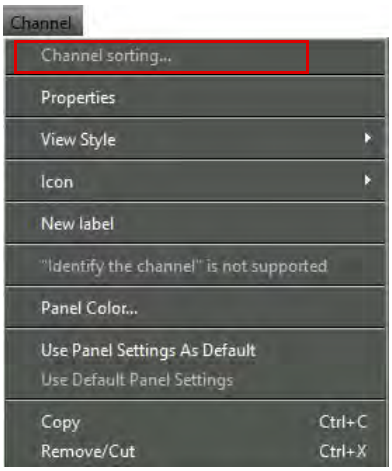


- Click on "Channel" > "Paste".
  The panel appears in the selected scene.

Sorting panels for multi-channel systems

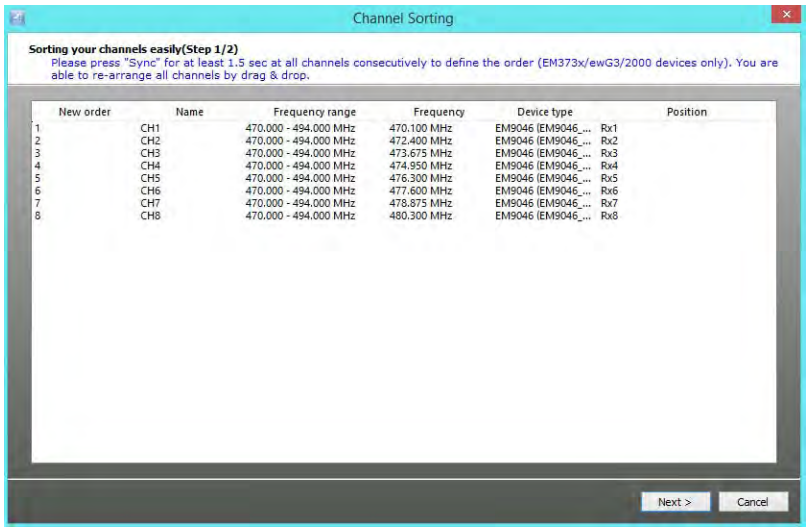
The following function allows you to conveniently determine the sequence of the panels for devices of the ew G3 and 2000 series and EM 3732-II receivers.

EM 9046 receivers are automatically sorted according to their channels.



To change the sequence of the panels:

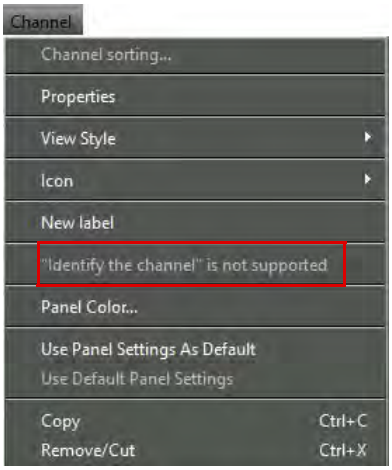
▶ Click on "Channel" > "Channel sorting ...".
The "Channel Sorting" window appears.



▶ Follow the instructions of the wizard.

Identifying channels

The "Identify channels" function allows you to quickly identify connected devices of the ew G3 and 2000 series and EM 3732-II receivers.



▶ Click on a panel.

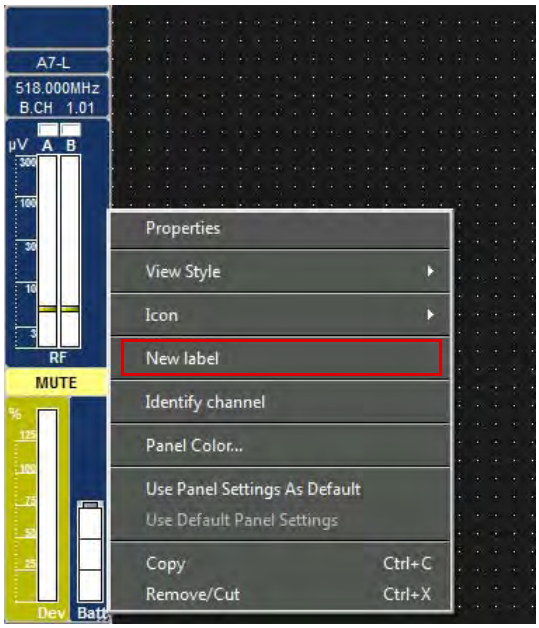
▶ Click on "Channel" > "Identify Channel".
"Identified" appears on the display of the selected device.

Panel commentary (label)

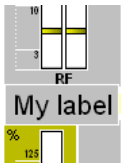
You can paste labels into the panels to provide a better overview. The labels can be freely dragged.

Pasting labels

▶ Right-click on the panel.
A shortcut menu appears.

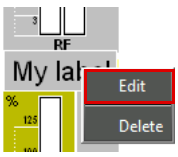


▶ Click on "New Label".
A label appears in the panel.



▶ Enter your commentary.
The font size is automatically adjusted to the size of the label. You cannot re-size the label, as the label size is dependent on the panel size.

To change the text at a later time:



▶ Right-click on the label.
A shortcut menu appears.

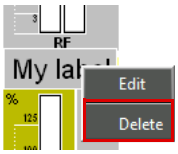
▶ Click on "Edit".
The cursor appears in the label.

Dragging labels

▶ Click on the label.
The move symbol appears.

▶ Move the label to the desired position.

Deleting labels

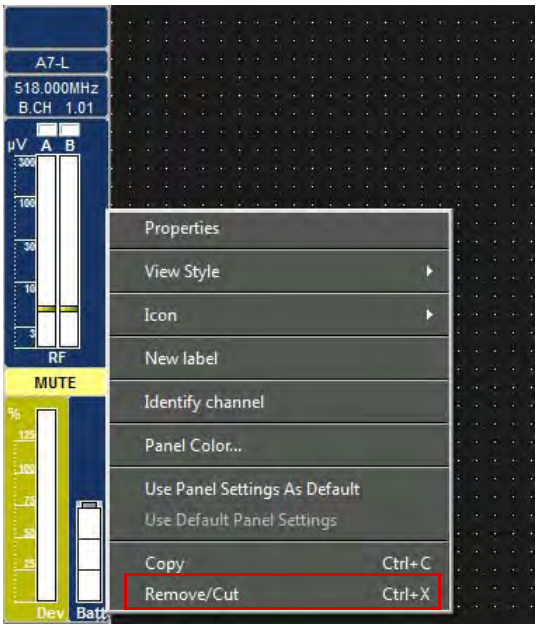


- Right-click on the panel.
  A shortcut menu appears.
- Click on "Delete".
  The label is deleted.

Deleting panels

To remove unused panels from the display area:

- Right-click on the panel.
  A shortcut menu appears.



- Click on "Remove/Cut".
  The panel is deleted. The panel settings are lost. The set device parameters are retained. The eye in the system window is removed for this scene.

To restore all panels:

- Click on "System" > "Refresh Device List".
  All stationary devices appear as panels with the default panel settings in the display area. The previous panel settings are lost.

To restore individual panels:

- Read the chapter "Creating panels" on page 76.

Configuring devices

Configuring streaming

The WSM allows you listen to live audio streams received by EM 9046 receivers.

The WSM supports streaming of RTP/RTSP audio received by compatible EM 9046 receivers and also supports playback of Dante audio using Audinate's "Dante Virtual Soundcard" (DVS).

Dante Virtual Soundcard is a software that turns your computer into a Dante-enabled device, allowing Dante audio to be transmitted and received via its standard Ethernet port.

Streaming using RTP/RTSP

If the WSM is in online mode and an EM 9046 is connected to your computer, you can stream audio using the RTP/RTSP protocol and listen to it by clicking on the headphone icon on the EM 9046 channel strip.

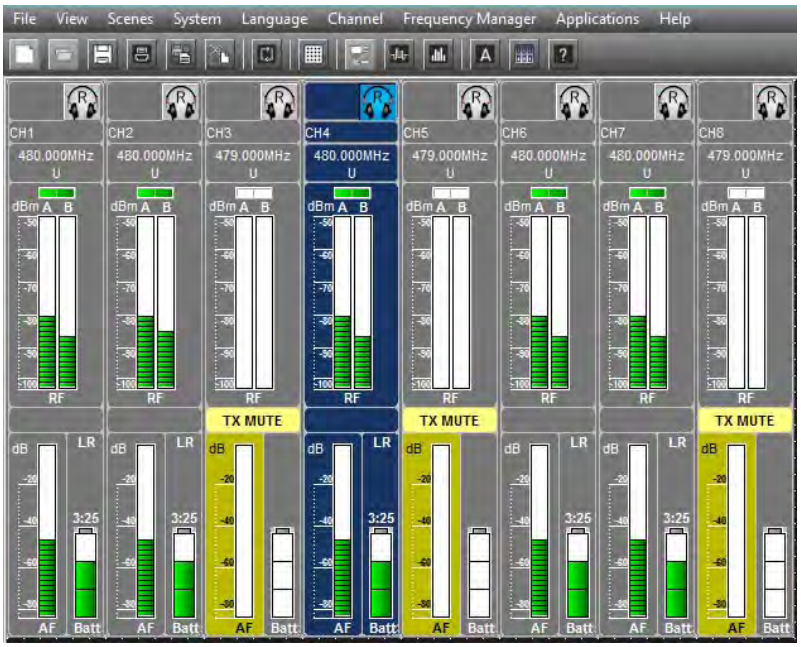
A gray headphone icon indicates that the EM 9046 receiver is offline or that the firmware of the EM 9046 does not support RTP/RTSP streaming.

RTP/RTSP streaming is supported from the following EM 9046 firmware version: EM9046_3_0_3 (for how to update the EM 9046 firmware, see page 29).

To start RTP/RTSP steaming:

▶ Click on the headphone icon.

The background of the icon turns blue, indicating that the stream is playing.



Using the RTP/RTSP streaming protocol (R) you can listen to one channel at a time. If you want to listen to more than one channel at a time, you have to use a Dante-enabled device.

Streaming using Dante

Required hardware

You require an EM 9046 receiver equipped with an EM9046 DAN module (a Dante module provided by Sennheiser).

Required software

For Dante playback, you require Dante Virtual Soundcard by Audinate. You additionally require the "AVS Firmware Updater" software developed by AuviTran to update the firmware of the EM 9046 DAN modules. The "AVS Firmware Updater" is only available for Windows.

Turning on Dante Virtual Soundcard

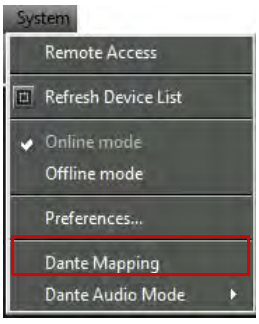
To turn on Dante Virtual Soundcard:

- ▶ Open the Dante Virtual Soundcard Control Panel.
- ▶ Click on the grayed out power on/off button.
  The power on/off button turns green, indicating that Dante Virtual Soundcard is turned on (for more information, refer to the Dante Virtual Soundcard User Guide).

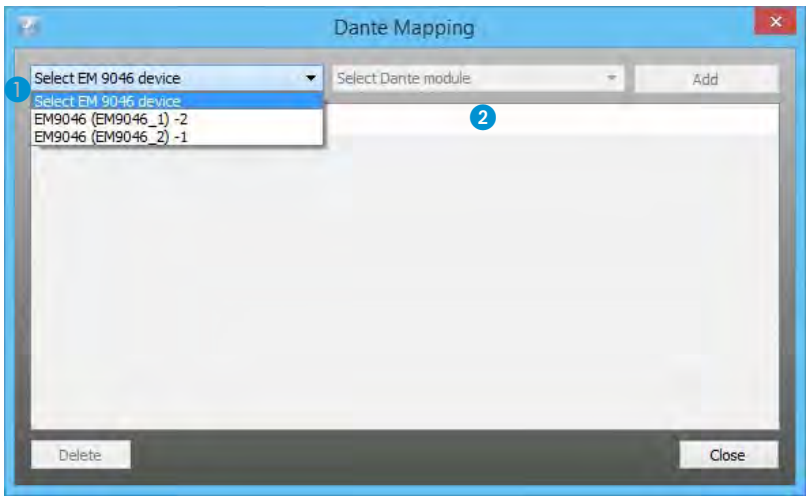
Using Dante in WSM

- Make sure that the EM 9046 with the installed Dante module is connected to the WSM and that Dante Virtual Soundcard is running.
- Make sure that all Dante hardware devices (including third-party Dante-enabled products) are configured in Unicast mode before you start streaming using Dante.

Mapping EM 9046 receivers to their corresponding Dante modules

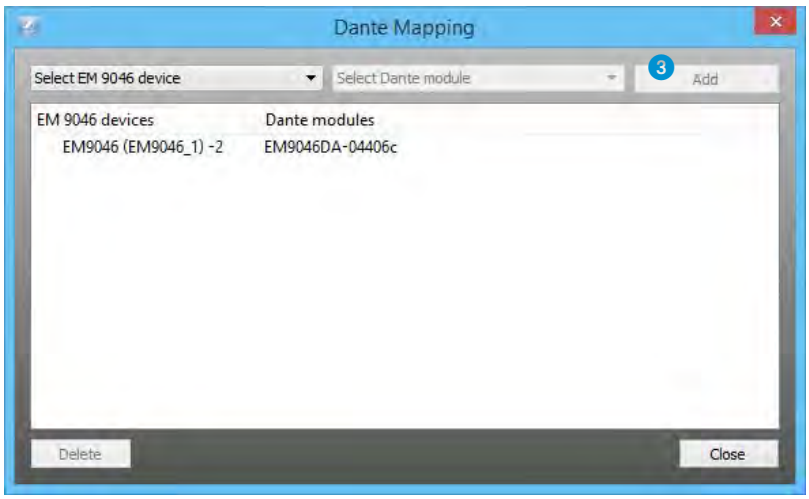


- Click on "System" > "Dante Mapping".
  The following window opens.



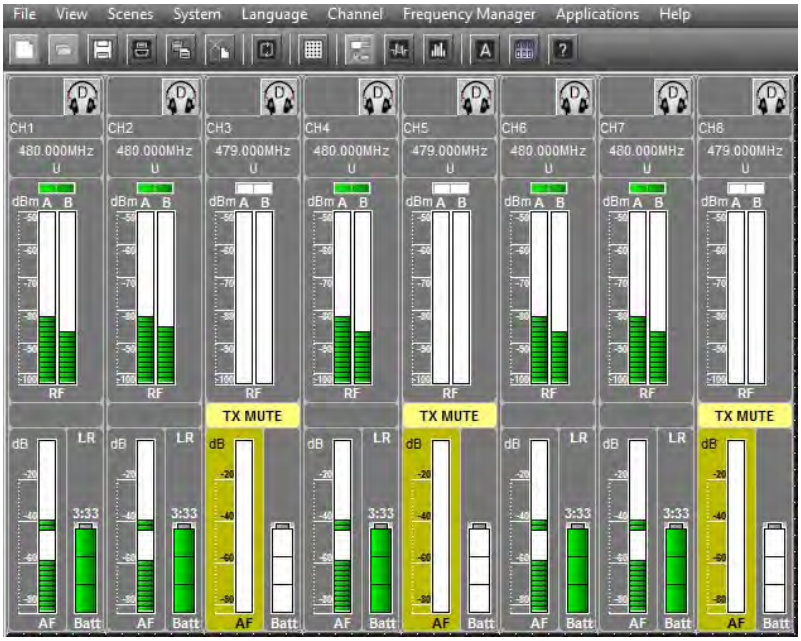
- Select the EM 9046 device from the first drop down list (1).
- Select the corresponding Dante module from the second drop down list (2).

If you map an EM 9046 to a wrong Dante module, streaming may not work properly.



- Click on "Add" (3) to map an EM 9046 receiver with its corresponding Dante module.
- Click on "Close".

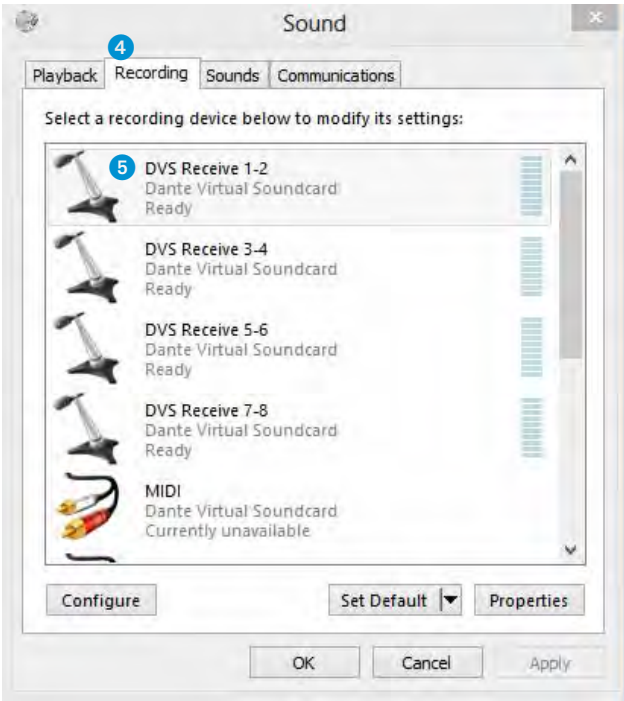
Once all EM 9046 receivers are mapped to their corresponding Dante modules, the icon shown on the left appears on all EM 9046 channels strips.

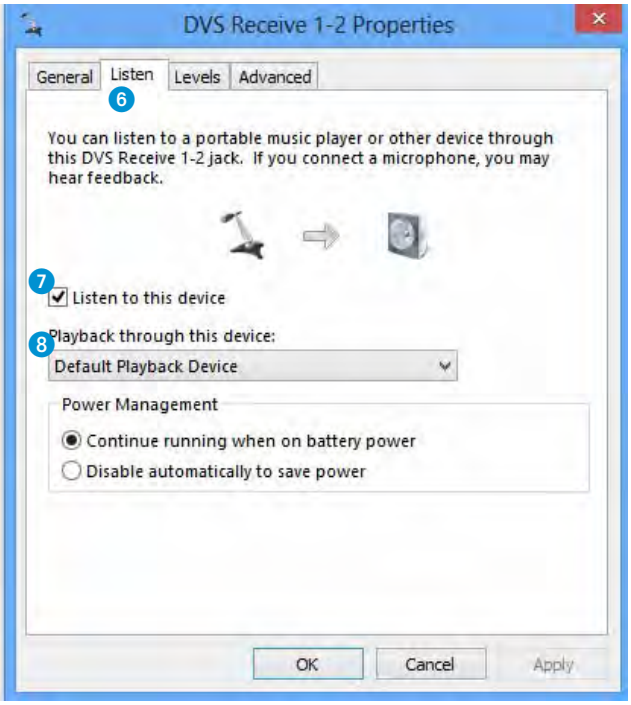


Required settings in the Windows Control Panel

To configure your Windows PC:

- Right-click on the speaker icon  at the bottom right corner of the screen of your Windows PC and select "Sounds". Then click the "Recording" (4) tab.





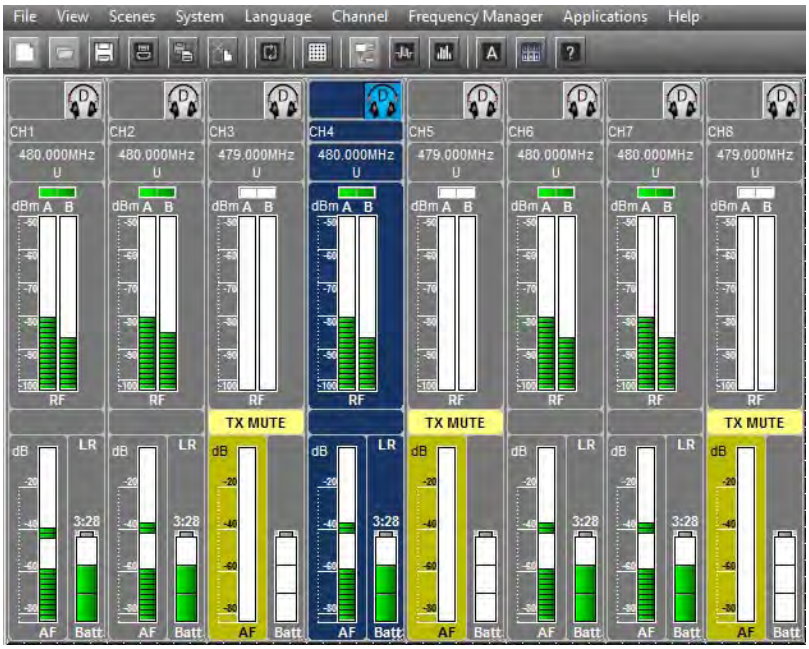
- Double-click on "DVS Receive 1-2" (5).
- Click on the "Listen" tab (6) in the "DVS Receive 1-2 Properties" window.
- Activate the "Listen to this device" check box (7).

- Ensure that "Default playback device" (8) or your desired output device is selected.
- Click on "OK".

To start streaming:

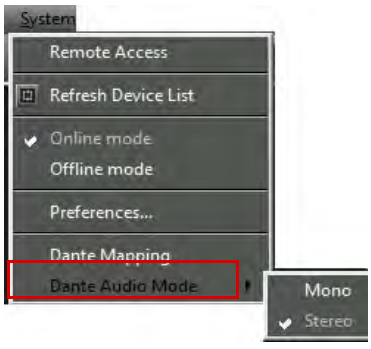
- Click on the icon on one of the EM 9046 channel strips.

The background of the icon turns blue, indicating that the stream is playing.



Selecting the audio mode (mono or stereo) for a Dante stream

To select the audio mode for your Dante stream:



- Click on "System" > "Dante Audio Mode".
- Select "Stereo" to play the stream in stereo mode.

. The EM 9046 channels are mono so that the second channel of a stereo stream is muted when streaming directly to the computer/WSM. However, if you first route your audio stream from the EM 9046 to a Dante-enabled mixing console, you can create a stereo mix which can then be played in stereo.

or:

- Select "Mono" to play the stream in mono (the stream is played on both channels of the output device).

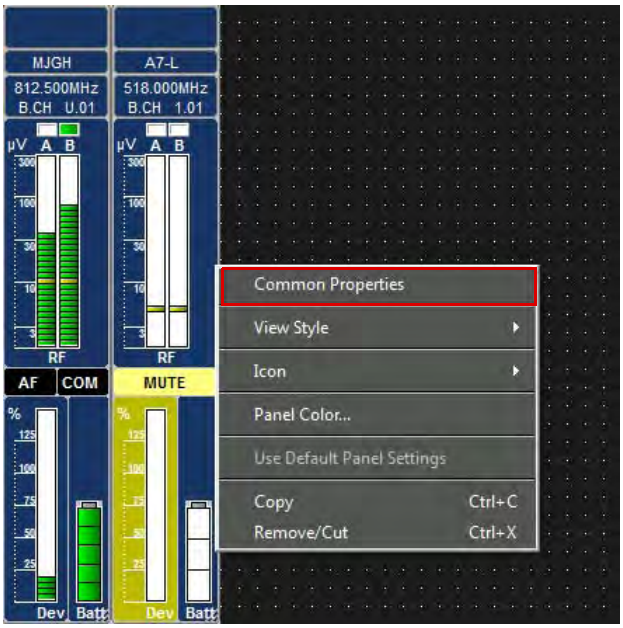
Setting parameters in the "Properties" window

You can configure stationary devices and the corresponding portable devices using the "Properties" window. To do so, select one or several panels (see page 76).

Displaying an overview of parameters

To display the parameters of the selected device:

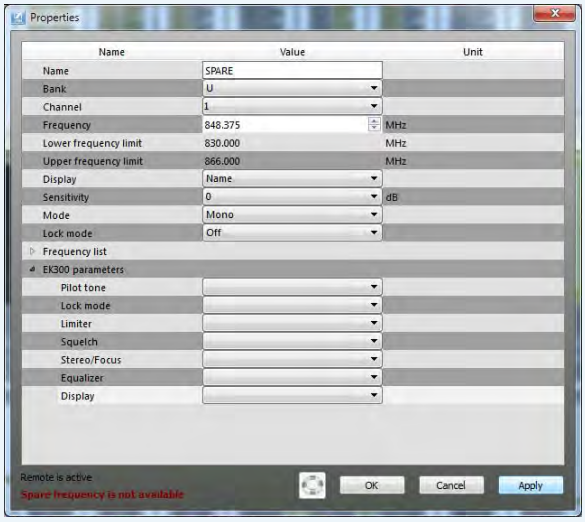
▶ Right-click on a panel.
The shortcut menu appears.



▶ Click on "Properties" or "Common Properties".
The "Properties" window opens. The parameters for the device appear in the left column ("Name"). To the right, the associated values ("Value") and units ("Units") are shown.

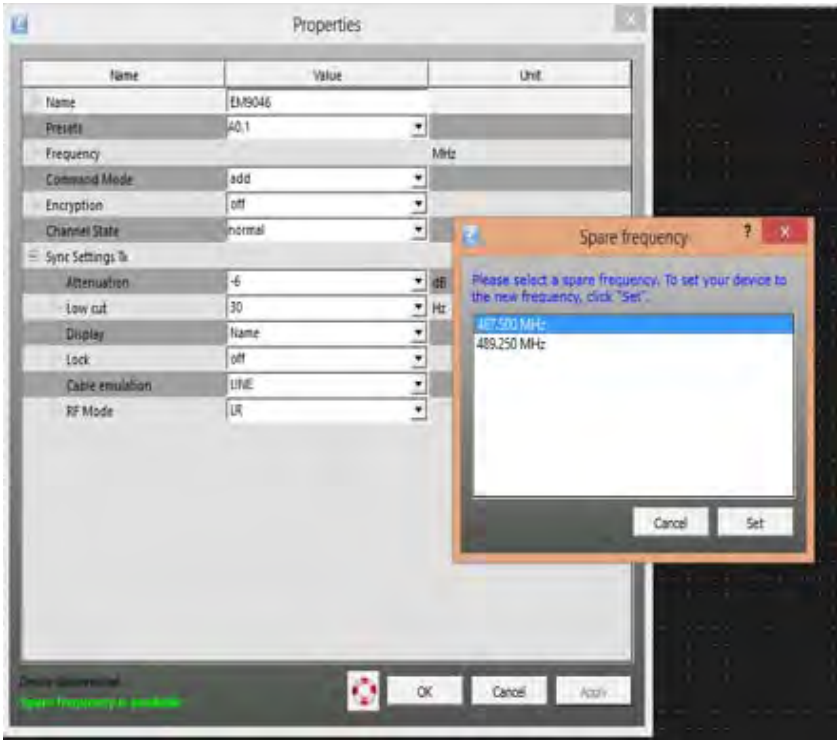
Dialog window of a wireless microphone system

Dialog window of a wireless monitoring system



If you have selected several devices, only the identical, i.e common, parameters of the devices are displayed. All other fields contain no information.

Using spare frequencies from the "life belt" option



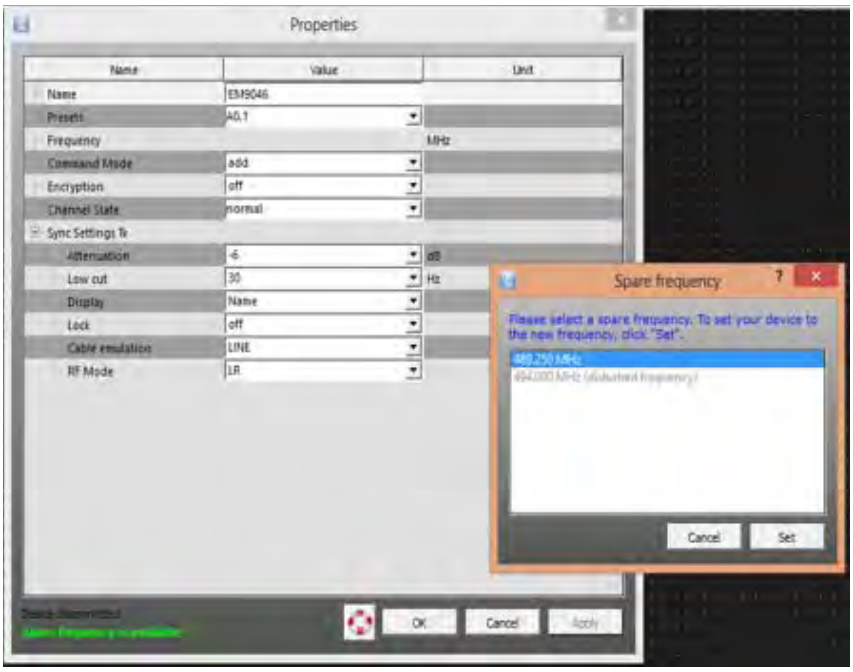
The "life belt" icon in the "Properties" window is only enabled if you have configured your system using "Professional Setup" (see page 41), i.e. if

- you have allocated coordinated frequencies as spare frequencies,
- the spare frequencies are within the frequency range of the device,
- the system region of the spare frequencies is the same as the system region of the device and
- the device type of the spare frequency is the same as the device type of the device.

The "life belt" icon provides access to the "Spare frequency" dialog which lists the pre-coordinated spare frequencies that can be used if the operating frequency of your system is disturbed or interfered with.

The disturbed frequency is displayed in light gray font in the "Spare frequency" dialog.

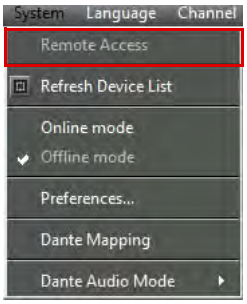
If you select a spare frequency from the "Spare frequency" dialog, this frequency is removed from the "Spare frequencies" dialog and assigned to the device in the "Properties" window.



If there are no spare frequencies available for the frequency range, the life belt icon in the ''Properties'' window is disabled.

Changing the parameters of a device

Before you can change parameters, you must activate the ''Remote Access'' menu item:



▶ Click on ''System'' and check if the ''Remote Access'' command is ticked.

If ''Remote Access'' is not ticked:

▶ Click on ''Remote Access''.
You may be requested to enter a password (see page 10). A tick appears in front of the menu item. A red dot appears in the panel. When you call up the ''Properties'' window (see next section), ''Remote Active'' is displayed in the lower part of the window.

The parameters that you can change depend on the respective device type. Specific information on the parameters can be found in the instruction manuals for the devices.

Line highlighted in	Meaning
white	• You can change these parameters. • The data transfer to the devices was successful.
yellow	• The parameter has been changed but has not yet been transfered to the devices.

▶ Click on the arrow next to the corresponding parameter.
A selection list appears.

▶ Select the desired value.

▶ Click on ''OK''.
The window closes; the new parameters are transfered to the corresponding device

.

- The frequency of the device can only be changed when the channel bank ''U'' is selected.
- If you have selected several panels, you can simultaneously change the parameters of the selected devices.

Recording the field strength using the tools

The "RF Spectrum Analyzer" tool

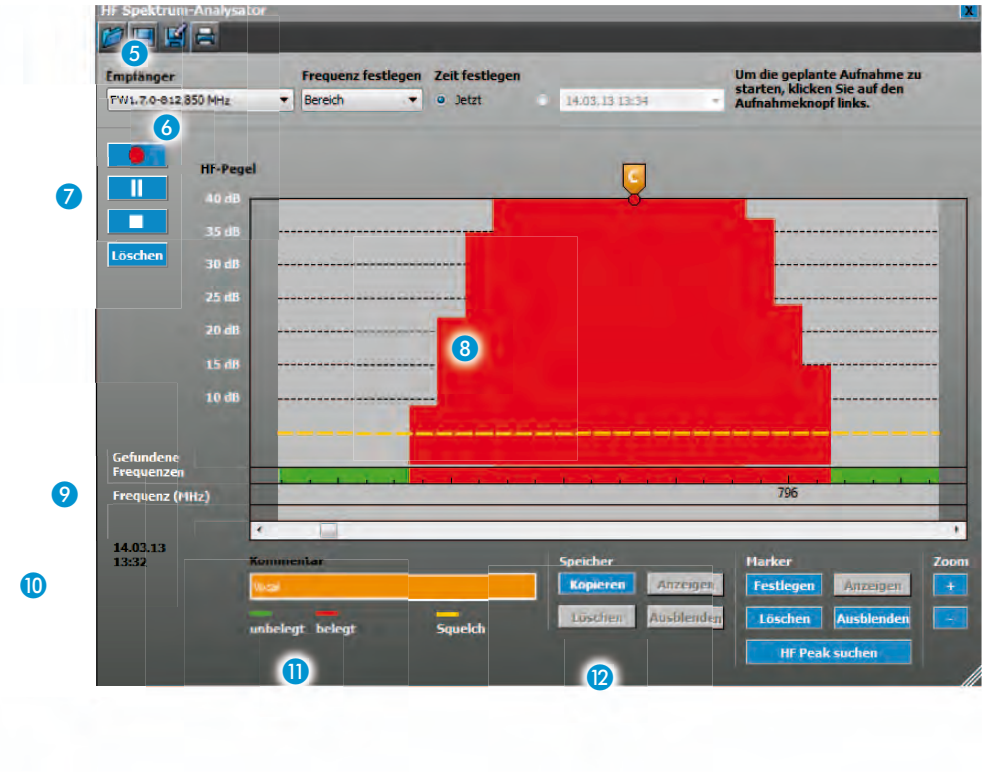
The "RF Spectrum Analyzer" tool allows you to get a clear picture of the frequency spectrum on location and provides you with all the necessary information for planning your wireless system – more up to date and reliable than any list

- If you want to use the "RF Spectrum Analyzer" tool during live operation, select a receiver that is not required in the transmission.
- After you have completed the measurement with the "RF Spectrum Analyzer", you have to set the frequency of the receiver again.

Calling up the "RF Spectrum Analyzer"

- In the system window, click on the "Tools" tab.
- Click on the "RF Spectrum Analyzer" icon.
- Keep the mouse button pressed and drag the icon in the scene.
  The "RF Spectrum Analyzer" window appears in the scene.

The "RF Spectrum Analyzer" window



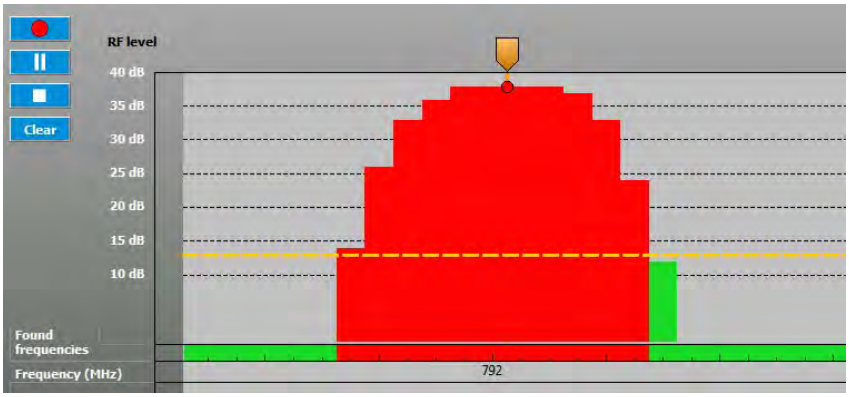
5 Toolbar
6 Selection area
7 Recording bar
8 "RF Level" window (display range of up to 40 dB max.)
9 "Memory", "Found Frequencies" and "Frequency (MHz)" displays
10 Display of the current date and time
11 "Comment" field
12 Buttons of the "Memory", "Marker" and "Zoom" group

6 Selection area

In the selection area, you can:

- select a stationary receiver (see page 98),
- select the frequency range (see page 99) and
- preset the start time for the recording (see page 98).

8 "RF Level" window



This window displays the measured field strength of the different frequencies within the receiver's frequency range as vertical bars (display range of up to 40 dB).

The set squelch threshold is given as a reference. The squelch threshold is shown as a horizontal dotted line.

Color	Meaning
green	"free": The field strength is below the squelch threshold and is displayed as an unused frequency.
red	"occupied": The field strength is above the squelch threshold and is displayed as an occupied frequency.
yellow	"squelch": Squelch threshold

The squelch threshold can be adjusted in the "Parameter" window (see "Setting parameters in the "Properties" window" on page 89).

"Found Frequencies" display

The "Found Frequencies" displays the occupied frequencies detected during the recording as red squares.

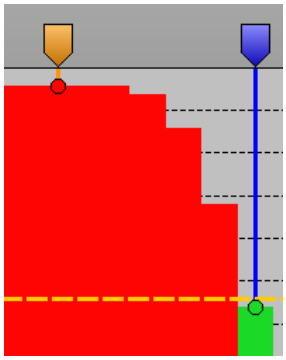
"Frequency (MHz)" display

The frequencies are shown on the x-axis of the "Frequency (MHz)" line. The frequency range depends on the selected receiver and the setting made under "Set Frequencies".

"Memory" display

The "Memory" display is only shown if a recording from the temporary memory is displayed (see "Temporarily saving recordings and comparing them" on page 103).

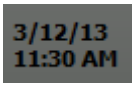
Markers and comments



Important occurrences can be marked and commented. The markers are displayed as vertical blue lines. A blue flag appears above them.
When you click on a marker, the line and the flag turn to orange. When you move the mouse pointer over a marker, a box will appear above the marker, indicating the time and the measured field strength of both antennas.

When you have clicked on a marker, you can enter a comment in the "Comment" field. A "C" appears in the flag of the marker. The comment is displayed again when you click on the marker (see "Marking measured values and commenting on them" on page 104).

Display of the current date and time



The current date and time are displayed. Date and time are taken from the operating system.

The "RF Level Recorder" tool

The "RF Level Recorder" tool allows you to check the reception quality of your wireless microphone system. You can record the field strength of any transmitter in any area of the stage and, if necessary, optimize the antenna positions using the detailed graphical representation provided by the tool.

Calling up the "RF Level Recorder"

- In the system window, click on the "Tools" tab.
- Click on the "RF Level Recorder" icon.

- Keep the mouse button pressed and drag the icon in the scene.
  The "RF Level Recorder" window appears in the scene.

The “RF Level Recorder” window

5 Toolbar
6 Selection area
7 Recording bar
8 “RF Level” window (display range of up to 40 dB max.)
9 “Memory”, “Diversity” and “Rec Time” displays
10 Display of the current date and time and the set recording duration
11 “Comment” field
12 Buttons of the “Memory”, “Marker” and “Zoom” group

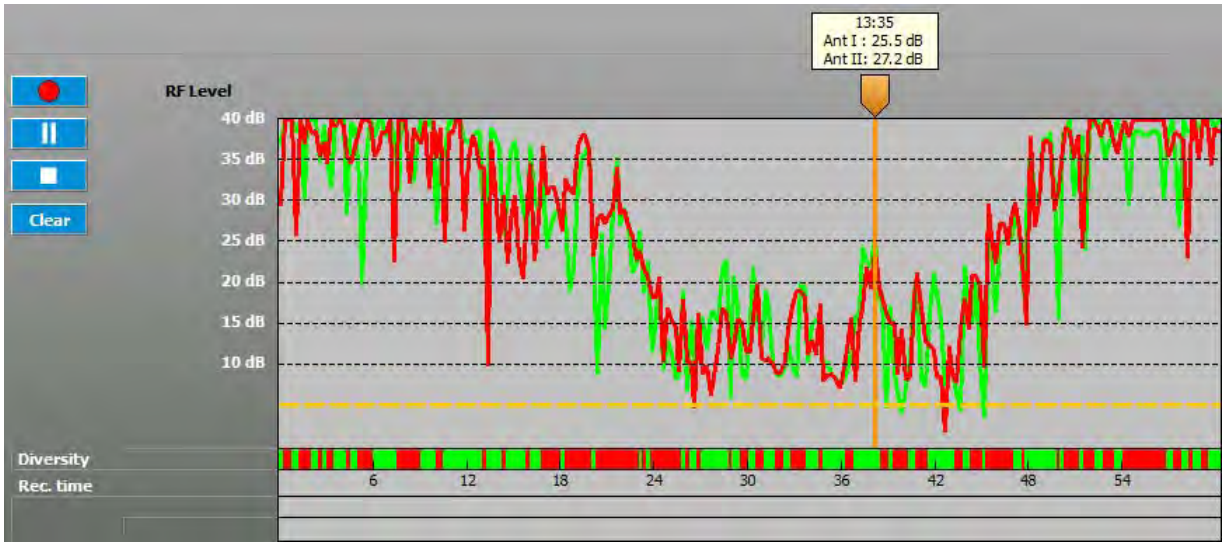
6 Selection area

In the selection area, you can:

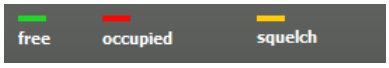
- select a stationary receiver (see page 98),
- preset the start time for the recording (see page 98) and
- set the recording duration (see page 98).

❽ "RF Level" window

This window displays the field strength of the receiver's diversity channels over a defined period of time.



The measured values of the field strength "RF Level" are displayed as colored bars over the defined measuring duration. Field strength levels of up to 40 dB max. can be displayed.



Color	Meaning
red	Diversity channel Antenna I/Antenna A
green	Diversity channel Antenna II/Antenna B
yellow	Squelch threshold

"Memory" display

The "Memory" display is only shown if a recording from the temporary memory is displayed (see "Temporarily saving recordings and comparing them" on page 103).

"Rec Time" display

The measuring duration is shown together with the current time on the x-axis of the "Rec Time" line. The measuring duration depends on the setting made under "Duration" (see "Setting the recording duration – "RF Level Recorder" only" on page 98).

"Diversity" display

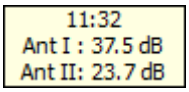
The colored bars in the "Diversity" line display the active diversity section.

Color	Meaning
red	The measured field strength of "Antenna I" / "Antenna A" is higher than that of "Antenna II" / "Antenna B"
green	The measured field strength of "Antenna II" / "Antenna B" is higher than that of "Antenna I" / "Antenna A"
white	The measured field strength of both antennas is below the squelch threshold; the receiver is muted

Example:
At 15:00 o'clock, the bar is green, i.e. antenna I/A is active. At 16:00 o'clock, the field strength of antenna II/B is stronger. Antenna II/B becomes active and the bar in the "Diversity" line is displayed in red.

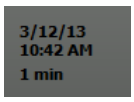
Markers and comments

Important occurrences can be marked and commented. The markers are displayed as vertical blue lines. A blue flag appears above them.
When you click on a marker, the line and the flag turn to orange. When you move the mouse pointer over a marker, a box will appear above the marker, indicating the time and the measured field strength of both antennas.



When you have clicked on a marker, you can enter a comment in the "Comment" field. A "C" appears in the flag of the marker. The comment is displayed again when you click on the marker (see "Marking measured values and commenting on them" on page 104).

Display of the current date and time and the recording duration



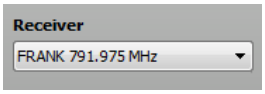
The current time, the date and the recording duration are displayed. Time and date are taken from the operating system. The recording duration is set under "Duration" (see "Setting the recording duration – "RF Level Recorder" only" on page 98).

Working with the tools

Selecting a stationary receiver for the recording

You can do the recording with any stationary receiver.

To select a stationary receiver:



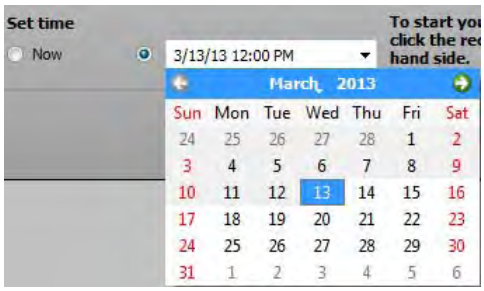
- Click on the arrow in the "Receiver" field.
  A list of the connected receivers with their respective frequency ranges appears.
- Select the desired receiver by clicking on it.

Presetting the start time for the recording

You can either start the recording immediately, or you can preset a start time.

To preset a start time for the recording:

- Click on the arrow in the "Set Time" field.
  A window that contains a calendar and the current time appears.



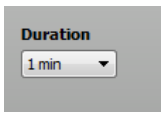
- Click on the arrows to the left and right of the month to change the month and the year.
- Click on the day to select the date to be entered into the date field.
- Enter the time directly in the "Time:" field.
- Make sure that all relevant devices for the recording are switched on at that time and that the WSM is running

. If you want to use the "Spectrum Analyzer" tool during live operation, select a receiver that is not required in the transmission.

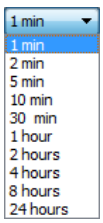
Setting the recording duration – "RF Level Recorder" only

You can select a recording duration from 1 minute to 24 hours.

To set the recording duration:

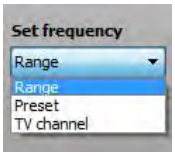


- Click on the arrow in the "Duration" field.
  A selection list appears.



- Select the recording duration from the list.
  The selected value appears in the "Duration" field.

Setting the frequencies – "RF Spectrum Analyzer" only

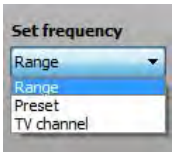


To manually set the frequency range to be recorded:

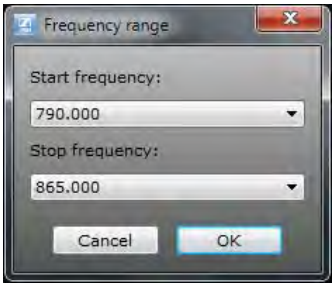
- Click on the arrow in the "Set Frequency" field.
  A selection list appears.
- Select one of the following menu items:
  - "Range" – to set the upper and lower limit of a frequency range (see page 99)
  - "Preset" – to select the channel bank of a receiver (see page 99)
  - "TV Channel" – to select the TV channels (frequencies) to be taken into account during the recording (see page 100)

Setting the upper and lower limit of the frequency range (Range)

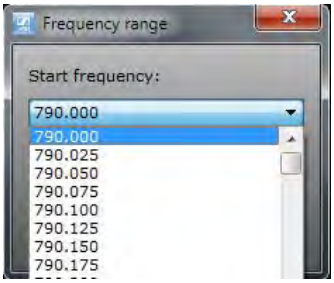
You can set the upper and lower limit of the frequency range to be recorded. Both frequencies must be within the frequency range of the receiver.



- Click on "Range".
  The "Frequency Range" window appears.



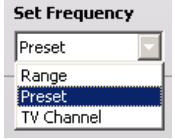
- Click on the arrow in the "Start" field.
  A list of frequencies from the frequency range appears.



- Select the lower limit.
- Click on the arrow in the "Stop" field to select the upper limit.
- Click on "OK".
  The dialog box closes. The "Frequency (MHz)" display (x-axis) is scaled to the selected frequency range. Only the selected frequency range is recorded.

Selecting a channel bank of a receiver (Preset)

You can select a channel bank of a receiver in order to only record the frequency range of this channel bank.



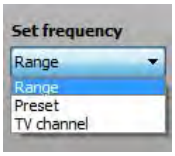
- Click on "Preset".
  The "Preset" window appears.

  Example EM 3732:

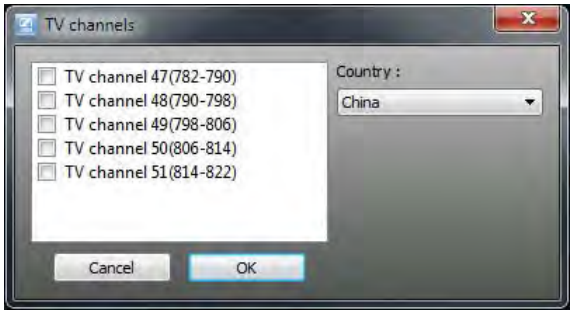
▶ Select a channel bank (e.g. ''Bank 1'') by clicking on it.
The ''Frequency (MHz)'' display (x-axis) is scaled to the frequency range of the selected channel bank.
Only the frequencies in the selected channel bank are recorded.

Selecting TV frequencies (TV Channel)

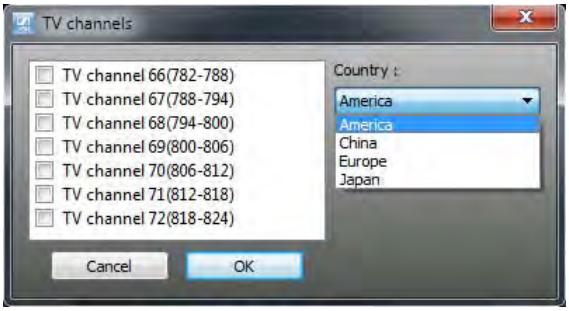
You can select TV frequencies from within the device's frequency range to be taken into account during the recording.



▶ Click on ''TV Channel''.
The ''TV channels'' window appears.



▶ Click on ''Country'' and select an entry.



▶ Activate the desired check box to select the TV frequencies to be recorded.
A tick appears.

▶ Click on ''OK''.
The dialog box closes. The selected TV frequencies are taken into account during the recording.

Overview of the buttons of the tools

Buttons in the toolbar	Function of the button
	Opens a saved recording.
	Saves the current recording under the same name.
	Saves the current recording under a new name.
	Prints the contents of the "RF Level" window of the current recording (up to 40 dB max.).

Buttons in the recording bar	Function of the button
	Starts a recording.
	Cancels the recording.
	Interrupts the recording.
	Deletes the last recording.

Buttons in the "Memory" group	Function of the button
	Copies the current recording to the temporary memory.
	Deletes the recording from the temporary memory.
	Displays the recording from the temporary memory.
	Hides the recording from the temporary memory.

Buttons in the "Marker" group	Function of the button
	Places a marker on a measuring value in the "RF Level" window.
	Deletes a marker from the "RF Level" window.
	Shows all markers.
	Hides all markers.
	Searches and jumps to the measured peak values.
	Searches and jumps to values below the squelch threshold.

Starting the field strength recording

After you have set the recording duration, you can start the field strength recording.

To start the recording:

- Click on the "Now" option button under "Set Time".
- Click on "Start".

If you have not yet saved the last recording, you will be asked if you want to save it (see "Saving recording data" on page 105).

Interrupting the field strength recording

To interrupt the recording:

- Click on "Pause".
  The field strength levels are not recorded during this time. Only the "Squelch" bar continues to move. The recording duration is not changed by an interruption.

To continue the recording:

- Click on "Start".
  The field strength recording is continued.

Canceling the field strength recording

To cancel the recording:

- Click on "Stop".

To start a new recording and to overwrite the cancelled recording:

- Click on "Start".

Deleting the last field strength recording

To delete the last recording:

- Click on "Clear".
  The recording is deleted form the memory and from the "RF Level" window.

Zooming the "RF Level" window in/out

The "Zoom" function allows you to zoom the "RF Level" window in and out. A zoomed-out window provides a better overview, a zoomed-in window shows details.

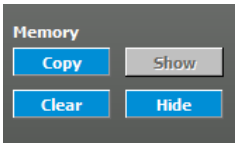
To zoom the "RF window" in:

- Click on the "+" button.
  The "RF window" is zoomed in. The scroll bar is automatically adjusted.

To zoom the "RF window" out:

- Click on the "–" button.
  The "RF window" is zoomed out. The scroll bar is automatically adjusted.

Temporarily saving recordings and comparing them



The "Memory" function allows you to temporarily save recordings. The measured values (bars) of the previous recording are displayed lighter. The superimposed measured values of the current recording a displayed darker. This allows you to compare two recordings.

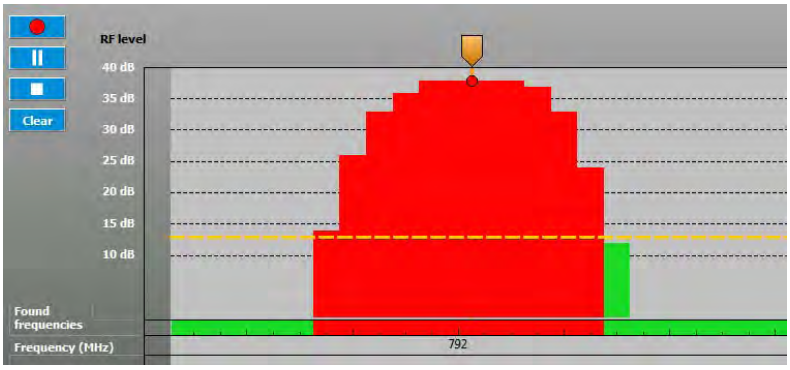
Temporarily saving a recording

▶ Click on "Copy".
The measured values are copied to the temporary memory. The comments and markers are not taken over.

After you have made another recording, you can show the previous recording by clicking on "Show" and directly compare the two recordings.

Showing the recording from the temporary memory

▶ Click on "Show".
The "Memory" line appears. The "Memory" line shows the colored bars displaying the respective active diversity section as shown before in the "Diversity" line.
The "RF Level" window displays the measured values (bars) of the recording from the temporary memory. These bars are displayed lighter while the superimposed bars of the current recording a displayed darker.



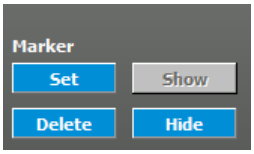
Hiding the recording from the temporary memory

▶ Click on "Hide".
The measured values (bars) of the recording from the temporary memory are hidden but are retained in memory.

Deleting the recording from the temporary memory

▶ Click on "Clear".
The measured values (bars) of the recording from the temporary memory disappear from the "RF Level" window and are deleted from the temporary memory.

Marking measured values and commenting on them



In order to be able to better evaluate the measured values of a recording, you can use the "Marker" function. This allows you to mark the measured values and provide them with a comment.

To mark a measured value and comment on it:

- Click on "Set".
  The mouse pointer changes to a cross.
- Move the cross to the measured value you want to mark.
- Place a marker by clicking on the measured value.
  The marker is displayed as a blue line with a blue flag.
- Enter your comment into the "Comment" field.
  Subsequently, a "C" appears in the flag.

To delete a marker:

- Click on the marker.
- Click on "Delete".
  The marker and the corresponding comment are deleted.

To hide all markers:

- Click on "Hide".
  The markers are hidden.

To show all markers:

- Click on "Show".
  The markers are shown.

To show a comment on a marker:

- Click on the marker.
  The color of the marker changes to orange. The comment is shown in the "Comment" field. You can change or add to your comment by clicking in the "Comment" field and entering your changes.

Finding minimum and maximum values

Searching for the minimum field strength – "RF Level Recorder" only

The "RF Level Recorder" allows you to search for measured field strength values that are below the squelch threshold. The search always refers to the measured values of both antennas.

- Click on "Search Low RF".
  The lowest measured field strength value that is below the squelch threshold is displayed. A marker appears at this point.
- Click again on "Search Low RF" to search for the next higher measured value.

Searching for the maximum field strength – "RF Spectrum Analyzer" only

The "RF Spectrum Analyzer" allows you to search for field strength peaks.

- Click on "Search RF Peak".
  The highest measured field strength value is displayed. A marker appears at this point.
- Click again on "Search RF Peak" to search for the next lower measured value.

Saving recording data

You can save the data of a recording as a CSV file. You can open and edit this file with any spread sheet program. Make a copy of the CSV file before editing it.

To save a file:

- Click on "Save".
  The data is saved.

  When the recording has not yet been saved, the "Save As..." window appears automatically.

To save a file under a new name:

- Click on "Save as".
  The "Save As..." window appears. The WSM proposes the "Data" folder in the program folder.
- If necessary, select a different folder in which to save the file.
- Enter a file name.
- Click on "Save".
  The measured values, markers and comments are saved. The dialog box closes.

Loading previously saved recording data

To load a previously saved recording (CSV file):

- Click on "Open".
  The "Open" window appears.
- Select the desired file.
- Click on "OK".
  The saved recording is loaded and appears in the "RF Level" window.

Printing recording data

To print the current "RF Spectrum Analyzer" window:

- Click on "Print".
  The "Print" window appears.
- Configure your printer and click on "Print".
  The current "RF Spectrum Analyzer" window is printed.

If a problem occurs

If a problem occurs that cannot be solved with the proposed solutions:

- Register on the Sennheiser website at www.sennheiser.com and describe the problem in the "Support" section

or

- contact your local Sennheiser partner.

Hardware

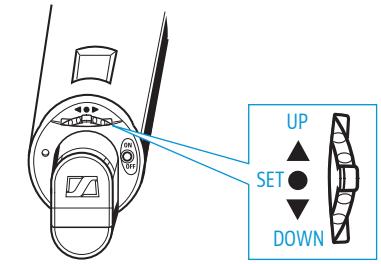
▶ First check the connections and cables of the devices.

▶ Check if all devices are switched on.

Software

The firmware update has failed (displays of the devices remain dark)

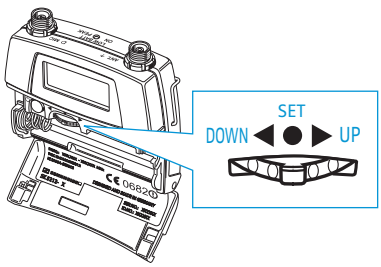
SKM 5200, SK 5212 and SKP 3000



▶ Start the updating process as described in the section "Updating the firmware of the devices" on page 29.

▶ Slide the multi-function switch upwards or to the right (UP) and keep it in this position (SKM 5200 and SK 5212) or press the "ON/OFF" button (SKP 3000) and keep it pressed.

▶ Briefly interrupt the power supply by pushing the batteries/accupack against the contact spring in the battery compartment.



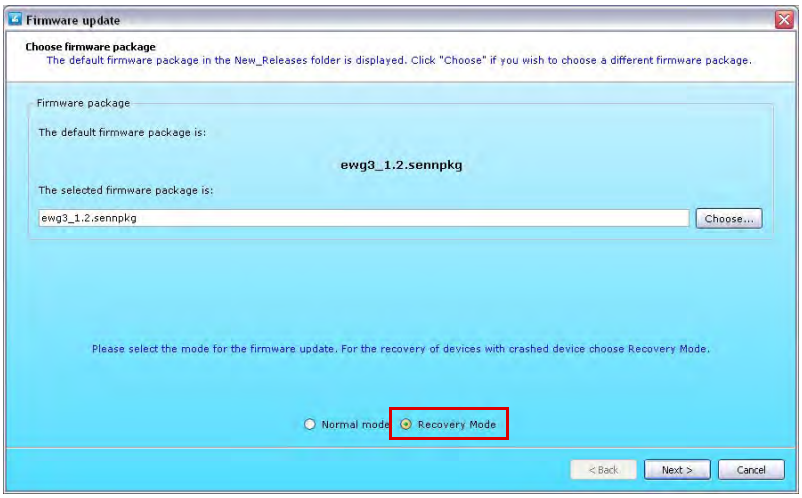
▶ Place the device again in front of the infrared interface.
The WSM displays a status bar. The firmware is updated.

▶ Release the multi-function switch (SKM 5200 and SK 5212) or the "ON/OFF" button (SKP 3000).

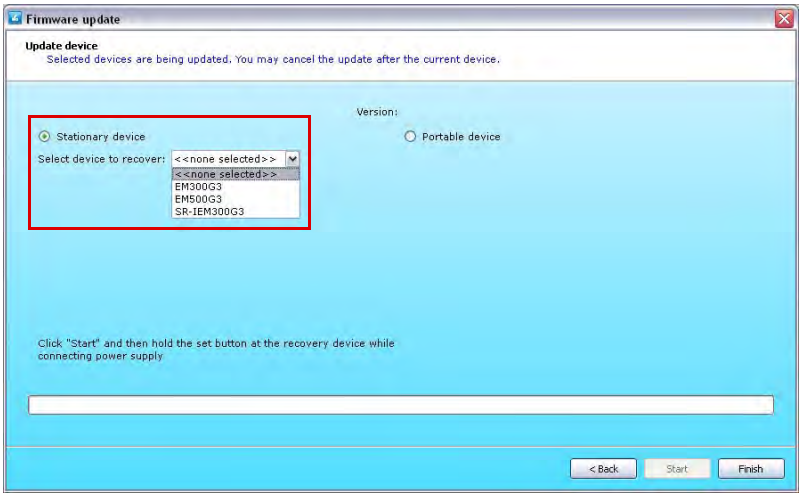
Stationary devices of the ew G3 and 2000 series

▶ Start the updating process as described in the section "Updating the firmware of the devices" on page 29.

- Select "Recovery Mode" in the resulting window and click on "Next >".



- Select the "Stationary device" option.
- From the selection field, select the device type.

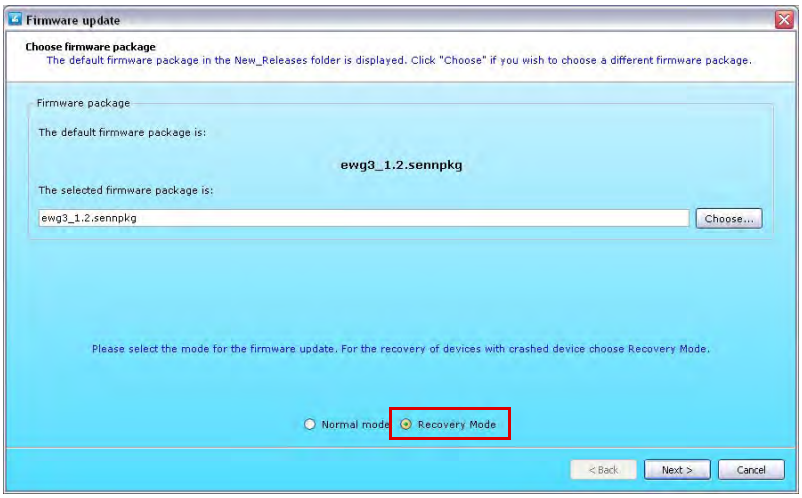


- Click on "Start".
- Disconnect the device in question from the mains.
- Keep the "SET" button pressed.
- Reconnect the mains plug.
  The WSM displays a status bar. The firmware is updated.
- Release the "SET" button.

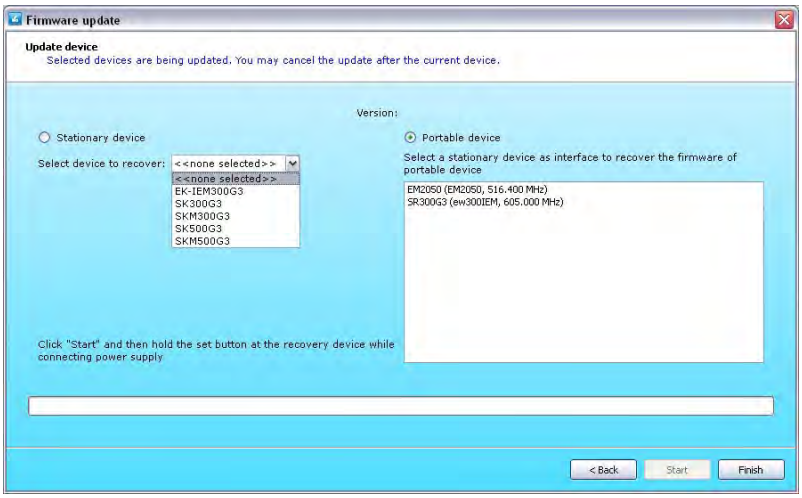
Portable devices of the ew G3 and 2000 series

- Start the updating process as described in the section "Updating the firmware of the devices" on page 29.

▶ Select ''Recovery Mode'' in the resulting window and click on ''Next >''.

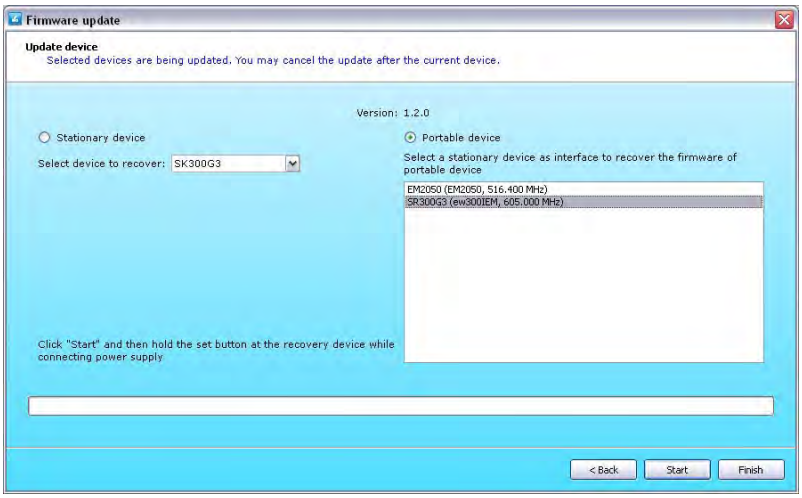


▶ Select the ''Portable device'' option.



▶ From the selection field, select a stationary device.

▶ In the right hand list, click on the affected portable device. ''Sync'' appears on the display of the selected device.



▶ Click on ''Start''.

▶ Keep the ''SET'' button pressed.

- Briefly interrupt the power supply by pushing the batteries/accupack against the contact spring in the battery compartment.
- Place the device in question in front of the stationary device with the "Sync" display.
  The WSM displays a status bar. The firmware is updated.
- Release the "SET" button.

The program does not launch

- Check that your PC satisfies the system requirements (see "System requirements" on page 5).
- Check the settings of your firewall; the WSM may be blocked by a setting.

The receiver panel does not appear

The firmware in the receiver has not yet been updated.

- Update the firmware in the receiver (see "Working with scenes" on page 72).

Device is not found

Device is switched off

- Switch on the device.

Firewall blocks the WSM

- Enable the corresponding ports for the WSM.

Device is separated by a router

- Manually register the device with the WSM (see page 11).

Glossary

ASIO

Audio Stream Input/Output (ASIO) is a computer sound card driver protocol for digital audio specified by Steinberg, providing a low-latency and high fidelity interface between a software application and a computer's sound card. ASIO allows musicians and sound engineers to access external hardware directly. Interface support is normally restricted to Microsoft Windows.

Deviation

Modulation deviation; modulation of the transmitter

Easy Setup

Function for allocating unused frequencies; a frequency preset scan can be performed to check all factory preset frequencies (presets). The spectrum of the selected frequency range is only checked selectively.

Firmware

Software that resides on a chip in the device. It can and, sometimes, must be updated. Updates can be downloaded from the Sennheiser website.

Frequency preset scan

Function for detecting (identifying) unused and occupied frequencies in the immediate vicinity.
The spectrum of the selected frequency range is checked selectively, i.e. only the factory preset frequencies (presets) and the frequencies stored in the channel bank "U" are checked.
The detected unused frequencies can be allocated to the devices manually or automatically.

Frequency scan

Function for detecting (identifying) unused and occupied frequencies in the immediate vicinity. The complete spectrum of the selected frequency range is checked. The detected intermodulation-free frequencies can be allocated to the devices manually or automatically.

Intermodulation

Interference due to intermodulation can occur if at least 2 transmitters close to the receiving antenna produce high input signals in the receiver. The two high frequencies generate intermodulation products at non-linearities in the receiver (e.g. in the mixer). This can also occur if 2 transmitters are operated too close to one another. Fully new frequencies result from this which may interfere with the system's other usable frequencies.

Panels

Each panel displays a channel. The panels contain, among other information, the name of the device, the current frequency and the field strength display.

Presets

Unchangeable, factory preset frequencies that are stored in the channels of a channel bank (except channel bank "U").
The frequencies within a channel bank are intermodulation-free.

Professional Setup

Function for allocating compatible frequencies; a frequency preset scan can be performed to check the complete spectrum of the selected frequency range; interfering frequencies from external devices can be excluded before the allocation of frequencies.

Squelch

Squelch is a circuit function that eliminates annoying noise (hissing noise) when the transmitter is switched off or when there is no longer sufficient RF power received by the receiver. The squelch suppresses all signals that fall below a certain threshold value. Only if a wanted signal of sufficient strength is received does the squelch open again.

WDM

The Windows Driver Model (WDM) is a framework for device drivers that was introduced with Windows 98 and Windows 2000.

WDM drivers are designed to be forward-compatible so that a WDM driver can run on a version of Windows newer than what the driver was initially written for, but doing that would mean that the driver cannot take advantage of any new features introduced with the new version.

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Publ. 10/17